



MODEL

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AIRPLANE

THE WORLD'S PREMIER R/C MODELING MAGAZINE

48120

NEWS

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Racing at Rialto

—page 26

USRA Winners' Circle



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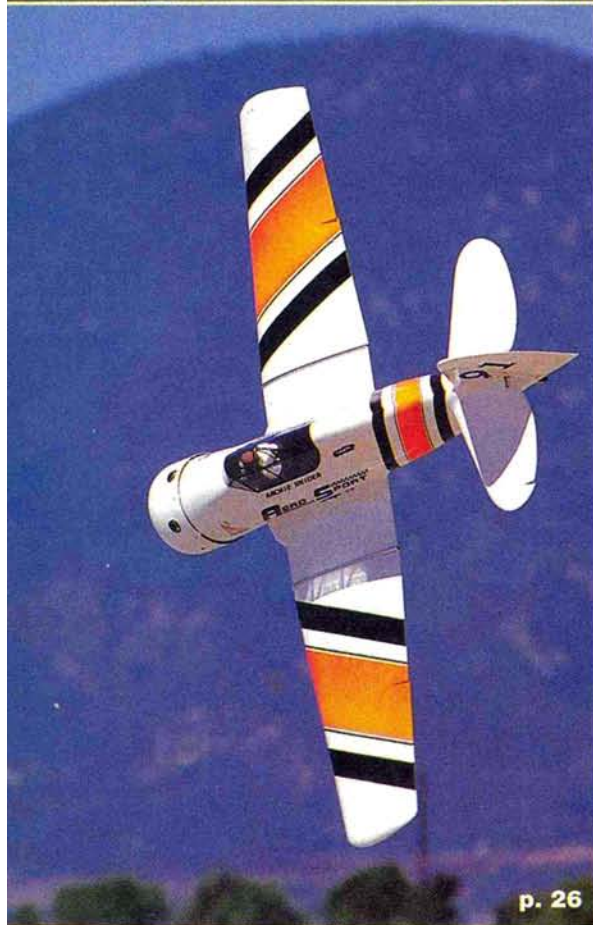
CANADA \$5.95



MODEL AIRPLANE NEWS



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ON THE COVER: Dennis Galloway's Byron AT-6 heads down the straightaway at the USRA Rialto World Finals (photo by Debra Sharp). Inset center: Rich Uravitch's One Design—pg 54. Inset bottom: Rhinebeck Jamboree—pg 40 (photo by Larry Marshall). ON THIS PAGE (top to bottom): Stan Clark's A3B takes off at the Rhinebeck Jamboree (photo by Larry Marshall); Archie Snyder's Texan about to rekit itself at the USRA Champs (photo by Debra Sharp); Sailplanes Unlimited Wilga 35 on final.

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EDITORIAL

by LARRY MARSHALL

WHAT IS A SCRATCH-BUILDER?

We've received some criticism for our use of the phrase "Scratch-builders' Plan Guide" in the cover announcement of our plans directory (January 1998). As is reflective of this long-standing debate of semantics, the authors of these criticisms let us

even something as trivial as this causes us to take issue with what others say and do? If we're going to debate, shouldn't we expend our time on more important things, rather than worry about trivia? We often fault politicians for working on small problems and ignoring the big

all of this is the fact that we spend time debating these sorts of things. Are there not more important things to discuss? Are we so interested in finding fault that

just about everybody's preference in aircraft types. These are big planes with gorgeous paint schemes, and they fly fast! Deb Sharp takes you to Rialto, showing you some of the excitement of these fantastic models and the guys who fly them.

Gerry and I are older and slower moving. While neither of us is quite old enough to have experienced WW I, we're both soft touches for aircraft with two or more wings. So, each September, we head for the Rhinebeck Aerodrome in Rhinebeck, NY, to attend the R/C Jamboree. The mix of full-scale aviation and great R/C models results in a very



PHOTOS BY GARY YARBROCK & DEBRA SHARP

know that "scratch-building" means the airplane was designed by the builder, and the "proper" term for building from someone else's plans is "plans-building."

The quick and simple response, of course, is "Who cares?," and this may well be the most appropriate response. But since this debate seems to be one that never goes away, I thought I'd throw in my two cents' worth. If one consults a dictionary, it's clear that the word *build* refers to actual construction of something, whereas *design* is a word we use when describing the process of creating a model plan. Thus, Mr. Webster would surely support the side of this debate that suggests that scratch-building refers to the process of building, not designing. In my view, scratch-building starts when the plan is on the table, whether you created it or it was created by someone else. Of course, my opinion and a buck will get you a cup of coffee. But competition categories of "designer scale" and "expert scale" make exactly this distinction, so I'm not alone in this view.

But maybe what's most important in

ones. Shouldn't we strive to be different? I think so.

RENO RACING AND WW I REMINISCENCE

Planes go fast, planes go slow. They are big, they are small. Some pilots compete; others just like to fly. The richness of our hobby provides us with all possible types, sizes and uses of model aircraft—so many, in fact, that we at *Model Airplane News* have a hard time covering them all, but we try. This month, we have examples of two events that epitomize the breadth of that diversity, and we have done our best to convey to you the enjoyment felt by the pilots.

The United States Racing Association (USRA) has brought an official race circuit to the world of Reno-style R/C racing. Points accumulation, à la Formula 1 car racing, results in the crowning of a national champion at the end of the season, which culminated this year at the USRA finals in Rialto, CA. Thompson Trophy, T-6 Texan, Warbird, Biplane and Formula 1 classes provided a place for

special atmosphere. This year was even better than in the past, as the changes in field arrangement and event activities encouraged a lot of guys to roll out their finest WW I and Golden Age machines. With castor oil in the air from full-scale rotary engines and the weekend sky filled with WW I and Golden Age R/C aircraft, an airplane aficionado could ask for no more. If you haven't experienced Rhinebeck, do so; you won't regret it.

NEW PRODUCT SEASON

New products are released by people in our hobby all the time. But springtime seems to generate a lot of new stuff to excite us and cause us to open our wallets, so I'd like to enlist your help. If you are a manufacturer, or if one of your buddies is about to release a product, let us know. We can't report on every new product, but if we have a clear photo and some descriptive text, we'll certainly share it with our readers. Send your product information to me at *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877. ✚



Balsa USA

TAUBE 40

NEW & IMPROVED!

and drawings and walks you through every step from beginning to end. Nothing is left to the imagination. This all-new kit is complete with dozens of jig-cut and precision die-cut parts to speed up and simplify construction. The plans are now produced by a Xerographic™ printing method in which ink is actually fused to the paper and cannot fade over time; this makes the plans highly accurate and very easy to read. One thing hasn't changed with the Balsa USA Taube 40: it's still a perfect 3-channel Sunday flyer that's a unique attention-getter. The Taube's balsa is of AAA quality throughout, and the kit comes with prebent landing gear and a hardware package. Specs: wingspan—62 inches; wing area—680 square inches; length—44 inches; wing loading—17 ounces per square foot; weight—5 pounds; engine required—.30 to .46 2-stroke, or .40 to .50 4-stroke. For more information, contact Balsa USA, P.O. Box 164, Marinette, WI 54143; (906) 863-6421; fax (906) 863-5878.

The kit that introduced so many of us to the beauty of WW I scale aeromodelling is better than ever and still at a great price. The Taube 40 has been completely redesigned and engineered to be easier to build, yet it retains the gentle, trainer-like flying characteristics

that have made it an all-time favorite. The scale look of the finished Taube wing belies the fact that it's easy to build and doesn't require any special tools or jigs. The new, step-by-step, photo-illustrated, 24-page assembly manual contains over 90 photos



Schtick

Sky Bench Aerotech claims that, with a wing loading of only 10.6 ounces per square foot, the Schtick is a model that everyone can fly, including rank beginners. With its specially designed high-tech airfoil, the Schtick will not tip stall and will recover quickly from pilot mistakes, yet it also offers a broad flight envelope. It will penetrate in wind, float around on calm summer days and perform aerobatics. Kit features: laser-cut wing ribs with accurately machined fuselage sides, formers, fin, rudder and wing sheeting. The kit includes a hardware package, aluminum landing gear and decals and is available directly from Sky Bench Aerotech, P.O. Box 316, Washington, MI 48094; phone/fax (810) 781-7018.

PZ-200

A cost-effective piezo gyro

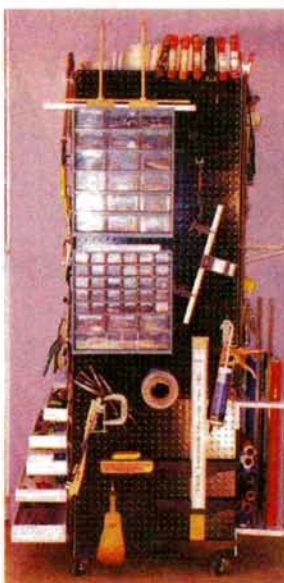
Piezo gyros cost considerably more than their mechanical counterparts, so many entry-level heli

pilots had to opt for mechanical units—until now: introducing Revolution's new PZ-200 piezo gyro. Priced at just \$119.95, it offers piezo performance, reliability, small size and easy hook-up at the same price as a mechanical gyro. According to Horizon, at just



1.04x1.04x1.09 inches, the PZ-200 is the smallest gyro available (piezo or mechanical), and at just 57 ounces, it's the lightest as well.

Revolution's new PZ-200 is very user friendly; just one lead goes to the receiver and one to the servo. Adjusting it is equally simple: the single gain setting is adjustable via a potentiometer on the unit—no confusing radio programming here. The PZ-200 also features a chrome case for RF shielding. For more information, contact Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511.



How would you like a workshop that could be stored in a 4x4-foot area when you're not using it? With the Super Caddy and one interior door as a building surface, you'll have a workshop on wheels that's *where* you want it, *when* you want it. And when you *don't* want it, fold it and roll it into a corner. What's more, it's only 6 feet, 3 inches high, so you can roll it through the door and into any room.

Constructed of 3/4-inch oak-look and white melamine, the Super Caddy is complete with fold-down panels, sliding drawers, tool and parts trays, peg-board-style plastic "organizer" areas, a bookshelf and a storage area for up to 14 rolls of covering



STOW-AWAY WORKSHOP

material and long balsa stock—truly a transportable "full-service" work station. The Super Caddy's 31x40-inch base opens to 40x72 inches and is also available separately. The base and top unit have an excellent look, are of heavy-duty construction and are fully assembled. Those who'd like to make their own, however, may prefer to order the available plans, full-size pattern and hardware kit. Send \$1 for an information packet to Tony Sengo, 13408 Apple Rd., Wilton, CA 95693; (916) 687-6441 or 687-8384; fax (916) 687-8384.

Cessna

For more than 20 years, the name "Jack Stafford" was synonymous with quality and scale integrity. Today, the line has been refined even further. Stafford's latest release is this Cessna 120 which, with the addition of flaps and an aft "D" window, can be built as a 140. With its big, high-lift wing, long tail moment and large tail surfaces, the Cessna has outstanding STOL flight characteristics. Owing to its monocoque construction and the quality of its select balsa and light plywood,



the fuselage is extremely light and rugged. Construction throughout is all balsa and ply, and the wing and fuse are fully sheeted. Kit features include: precision, laser-cut plywood bulkheads and assorted parts; machine-cut balsa parts; a full set of pop-in windows; formed windscreen; pre-bent, hardened-aluminum landing gear; hardened-aluminum dihedral brace; shaped strut material; formed cowl; interior kit; scale documentation package; and CAD plans. Specs: wingspan—98 inches; weight—12 to 14 pounds; length 66 inches;

120/140

WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Airwaves," *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606; email man@airage.com. Letters may be edited for clarity and brevity. We regret that, owing to the tremendous numbers of letters we receive, we can not respond to every one.

LIKES THINK-BUILDING TOO!

Just a short note to thank you for the editorial on "Think-building." Now I don't feel so guilty about the large box of plans I have stashed away that I will never build. I spend many hours "dreaming" about what to build while I am building the next plane. And it is true that you can do this (think-build-ing) anywhere you are: and after your article, I realize just how much time I do spend doing it! And it sure is cheap to do

Thanks again, and keep up the great job with the magazine; keep it about all the types of models.

RON FIKES, email

That's why I had to write the editorial, Ron; I've got several hundred plans that I've bought over the years, and most of them have never been touched by balsa dust. But how else could I have built the several hundred scale-model aircraft that my mind has constructed in the past?

Seriously, plans provide more bang for the buck than anything else in the hobby. I've learned more about building airplanes by taking several plans, a mug

WHAT FRIENDS SAY ABOUT FRIENDS

I do not remember the original cover that was used again on the January issue. That was long before my time. However, it might be of interest to your readers to know that the model shown on the cover was a Randy Randolph design.

HOWARD L. CHEVALIER, email

Howard, the cover on our January 1998 issue was originally the cover of our February 1930 issue. You should remember that plane well, as Randy used aerodynamic design principles he gleaned from one of your early books on the subject.

LM

AMA SCALE NATIONALS

I received an email from John Wood concerning my coverage of the 1997 AMA Scale Nationals (Model Airplane News, Jan '98), where I incorrectly identified his Spacewalker as belonging to Harold Hester, who was also competing. Both planes were exquisite; John's got in front of my camera.

I also incorrectly reported that Randy Smithheisler's PA-12 was the first electric model to place in Nats scale competition. At the 1989 Nats held in Washington, Model Airplane News contributing editor Bernard Cawley placed second in Sportsman Scale with a 1/6-



of my favorite brew, and spending the evening looking at how different designers solve the various structural problems associated with model design. When done with friends, it's even more fun.

As for "all the types of models," we've been working hard to maintain the broad scope that has made Model Airplane News so popular. In this issue, you'll see that while we've got fire-breathing, huge, Reno-style air racers, we're also talking about the more docile WW I planes at Rhinebeck. It's this variety that makes our hobby great, and we intend to continue to cover it as best we can.

LM

scale 1946 Taylorcraft powered by a Cobalt 40 on 18 cells. My apologies to Bernard.

JIM RYAN

LIKES ELECTRIC MULTIS

Glad to see the column on electrics. I enjoyed it. I would like to see some more detail on twin electrics for those as interested in them as I am.

I am building a 94-inch wingspan P-38. It has retracts and Fowler flaps. I started last January with plans and a partial kit purchased from a neighbor who was cleaning out his garage. Last Sunday, I did a "Spruce Goose" take-off and straight-ahead landing. No bad faults and, hopefully, the first real

flight next Sunday. I have had a great deal of help from Tom Hunt at Modelair-Tech. The plane has two of his H-1000 gear drives with Dewalt motors and 40-1700SCRC cells and will weigh 15 to 16 pounds when finished. Since I am going to fly it before giving it the final finish, I don't have any good photos to send now, but will when it is finished. It took me a little longer to finish than expected. It's my first big plane, first electric, first twin, first with retracts, first with Fowler flaps, so I am taking it sort of easy as I go along, asking a lot of questions and doing a lot of thinking before doing anything. Good luck with the writing.

JIM ALLEN, email

The mail I've received in response to the first "Current Thoughts" column has been very encouraging—lots of ideas and lots of evidence of great things going on in the electrics community. It will take me a while to feel my way toward providing the stuff you guys want to read, but with your help, we'll get there.

From the sound of your P-38 project, you should be writing the article on twins, not I. At 16 pounds, if you prop the motors such that they draw around 25 amps, you'll be putting around 60 watts/pound to the motors, and that should give you good performance, presuming the prop choice to give you this is appropriate (a deep-pitched prop with diameter determined by the ratio you're using in those belt drives).

There are two ways of getting into electrics successfully if you're an experienced modeler, and you've chosen the path of expert assistance. Getting good information from an experienced electrics flyer has allowed you to move directly toward the large multi-engine aircraft you desire.

For most modelers, however, I would recommend taking a smaller first step into electrics. Learning how batteries and motors function and how a flyer must use this equipment is better done, in my opinion, with a somewhat more modest effort.

Good luck with your 38, Jim. Send us photos when you get some finish on it.

LM

Pilot PROJECTS

A LOOK AT WHAT OUR READERS ARE DOING

SEND IN YOUR SNAPSHOTS

Model Airplane News is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable. We receive so many photographs that we are unable to return them.

All photos used in this section will be eligible for a grand prize of \$500, to be awarded at the end of 1998. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in!

Send those pictures to: Pilot Projects, Model Airplane News, 100 East Ridge, Ridgefield, CT 06877-4606.



CURTISS ROBIN

Ed Marek of Renton, WA, decided to build this 1/6-scale model after visiting the Boeing Museum of Flight and seeing the full-size airplane. He drew up plans for the 82-inch-span, 8 1/2-pound model from 3-views and a photo and used the OX-5 configuration because it allowed him to hide the Pitts-style muffler and most of the Magnum .46 inside the cowl. Ed writes, "Landings, takeoffs and touch-and-go's are very realistic, and [the model] handles very well at low, scale-like speeds."

SHOESTRING RACER

Wayne Morse of Lockport, NY, scratch-built this 1/3-scale model from his own plans. The 80-inch-span plane is 69 inches long, weighs 16 pounds and is finished in silk and dope. It's powered by a 31cc gas engine turning a 16x8 prop at 8,500rpm. Wayne writes, "The airplane is very fast and smooth, yet will slow down very nicely for landings and doesn't seem to have any bad habits."



GLOBEMASTER II

When Donald Briggs of Curtis, NE, started scratch-building this 82-inch-span model, he used it in a practical science class while teaching about aviation. He writes, "The kids got a lot of information on how real aircraft are built, how airplanes work in general and what the model hobby is all about." Donald patterned the Douglas plane after the full-size one he worked on in the late '50s at Larson AFB in Moses Lake, WA.

FAST INVADER

David Katagiri of San Diego, CA, originally designed and built this 105-inch-span Douglas A-26B to compete in the Madera Giant-Scale Air Races but has only used it as a show model. It's constructed of balsa and ply and has foam-core wings that have spruce spars and 1/32-inch plywood skins. The airframe is covered with 1 1/2-ounce fiberglass cloth and painted, and the control surfaces are covered with film. Two Webra .80s provide scale-like speed for the 19 1/2-pound model.





FOKKER FROM ARGENTINA

Adalberto López, José Iglesias and Eduardo Mesiniti are three modeling friends from Buenos Aires who collaborated on this Fokker D-VII built from 3-views in the Air Age Publishing book, "WW I Scale Aircraft Drawings." The 3-meter-span model has been entered in many contests in Argentina and has logged 25 flights to date. A Zenoah G-62 powers this big bird.



ELECTRIC ALBATROSS

Rolf Rørbu of Horten, Norway, sent this photo of his Royal Norwegian Air Force model. With two 25 AstroFlight geared motors on 28, 1700mAh cells and with 12x8 propellers, the 2.66-meter-span, 6-kilogram model can fly for approximately 8 minutes. Rolf writes that interest in electric floatplanes is increasing in Norway.

CALIFORNIAN FOKKER D-VII

John Gomez III of San Ramon, CA, built this 1/4-scale Proctor Fokker model. John, who is retired from the U.S. Air Force, spent nearly six



months on the German lozenge camouflage alone and writes, "Hope you enjoy the pictures, for the aircraft was a labor of love." A V-2 Laser engine keeps the model airborne.

FOKKER TRIPLANE STAFFEL

These Proctor models all belong to members of the Miami Valley R/C Club of Middletown, OH. They were built by (left to right): Carl Schurenberg, Neil Van Cleve and Tom Welch. These "Red Barons" tell us, "The Dr.1s take off in a hurry and, although a little quick, fly very nicely. The three, three-wing silhouettes against the sky would bring tears to the Baron's eye. Landings are surprisingly slow and gentle, but just as the roll-out is almost complete, the triplanes calmly nose over."



1/4-SCALE RED BARON

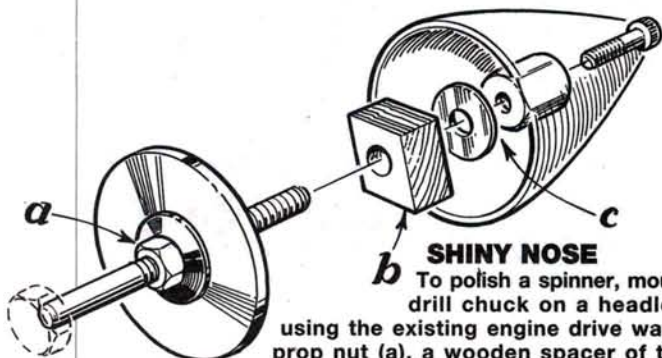
This 73-inch-span Fokker Dr.1 Flair kit was built by Gerald Rudisail of Spartanburg, SC. The 17-pound model is powered by a Zenoah G-38 swinging a 20x8 propeller; scale details include a DGA pilot and Williams Bros. wheels and machine guns. It's covered with weathered 21st Century fabric. Gerald writes that this was his first multi-wing project and adds, "It flies great but tends to flip over on its back when landing ... I understand the real plane did the same thing, so I guess that's really scale!"



Hints & KINKS

by JIM NEWMAN

Model Airplane News will give a free one-year subscription (or one-year renewal, if you already subscribe) for each idea used in "Hints & Kinks." Send a rough sketch to Jim Newman c/o Model Airplane News, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we can't acknowledge each one, nor can we return unused material.



SHINY NOSE

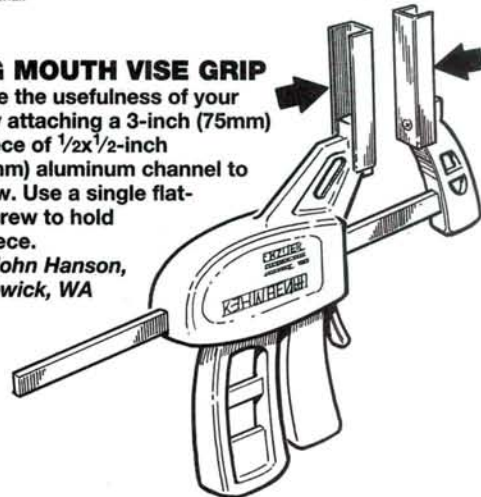
To polish a spinner, mount it in a drill chuck on a headless bolt, using the existing engine drive washer and prop nut (a), a wooden spacer of the same thickness as the propeller (b) and a second washer with the usual propeller adapter nut and screw (c).

Mark Donaldson, St. Joseph, MO

BIG MOUTH VISE GRIP

Enhance the usefulness of your grips by attaching a 3-inch (75mm) long piece of $\frac{1}{2} \times \frac{1}{2}$ -inch (13x13mm) aluminum channel to each jaw. Use a single flat-head screw to hold each piece.

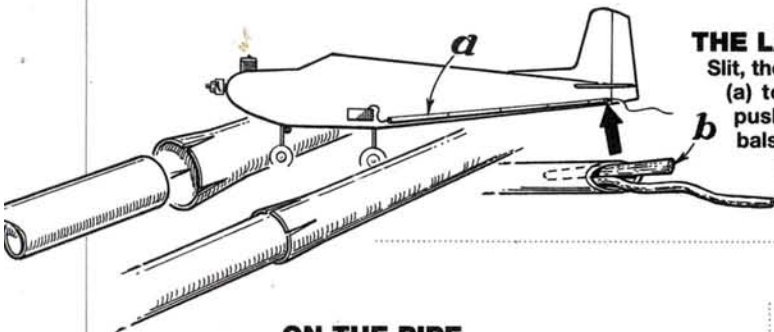
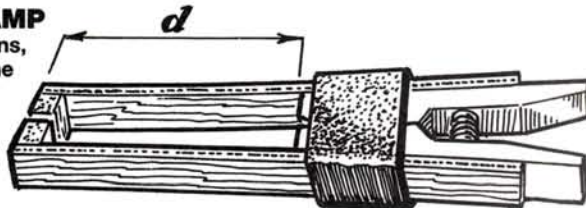
John Hanson,
Kennewick, WA



DEEP CLEARANCE CLAMP

Contact-glue strips of plywood to the jaws of plastic clothespins, securing them with wide bands cut from a bike inner tube. The bands add good clamping force to the pin's spring and allow deep clamping jobs as spar webs. The throat depth (d) is $2\frac{1}{2}$ inches (65 mm), and the jaws open to $1\frac{1}{8}$ inches (28mm). Note the balsa block jaws glued to the ends of the strips.

C.H. Bennett, Mt. Gilhead, OH



THE LAST STRAW

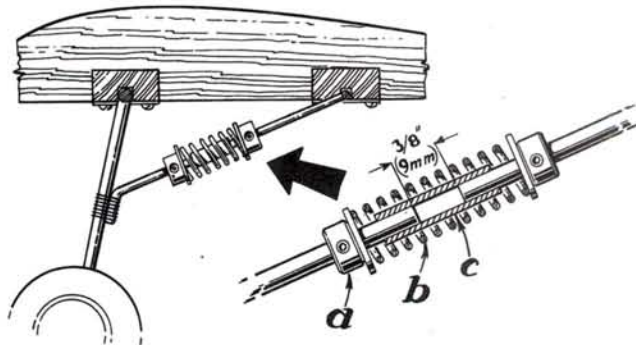
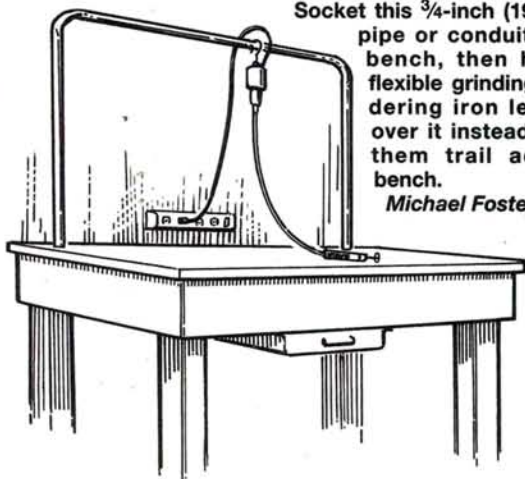
Slit, then glue together drinking straws to create an antenna conduit (a) to go inside your model. After the antenna wire has been pushed down through the conduit, secure it at the rear with a balsa wedge (b) to stop it shooting forward in a sudden stop. Yes, it does happen!

Ronald Lash, Leonardtown, MD

ON THE PIPE

Socket this $\frac{3}{4}$ -inch (19 mm) PVC pipe or conduit into your bench, then hang your flexible grinding tool, soldering iron leads, etc., over it instead of having them trail across the bench.

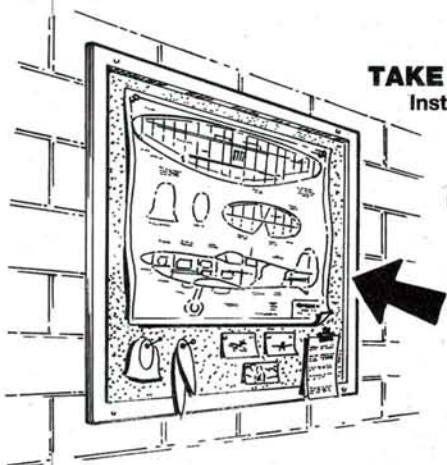
Michael Foster, Elgin, TN



SPRING TIME

Even with good landings, the gear tends to bend backward. Add this simple spring brace to keep it where it should be. Use wheel collars (a) with washers, a hardware store spring (b) and a piece of metal tube (c). The halves of the leg are free to slide in the tube.

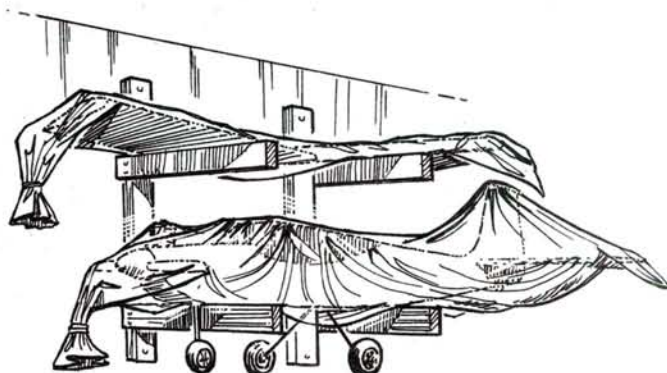
Mike Purcell, Barrington, IL



TAKE NOTICE

Install a large corkboard on the wall of your shop and you will wonder how you managed without it! Tack up your plan while completing the latest model; pin up your templates; put up your reference photos, club rules, etc.

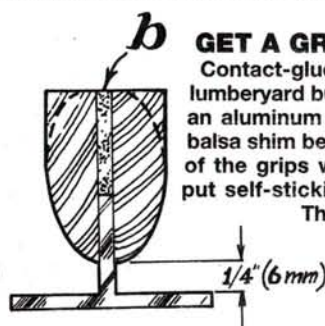
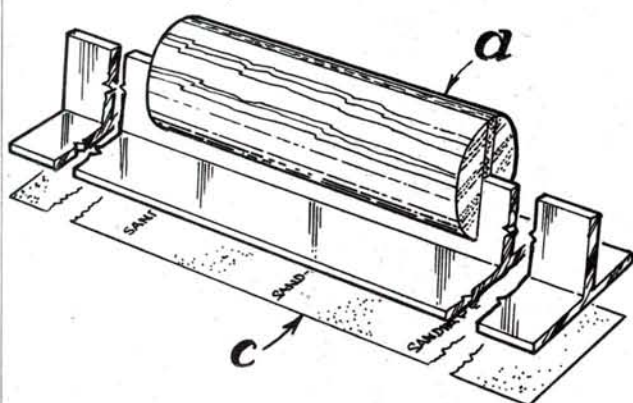
Chris Torp,
Hammondsport, NY



IN THE BAG

Slip old plastic garment bags from the dry cleaner over your models before putting them on the rack. This will keep sanding dust and plain old dirt off them until you go out to fly. You did put after-run oil in the engine, didn't you?

Marty Waldron, McMinnville, TN



GET A GRIP

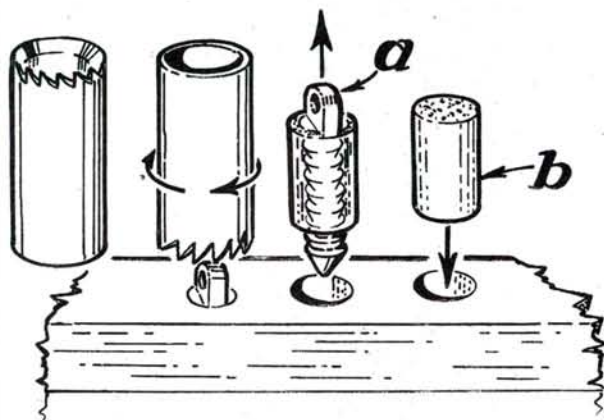
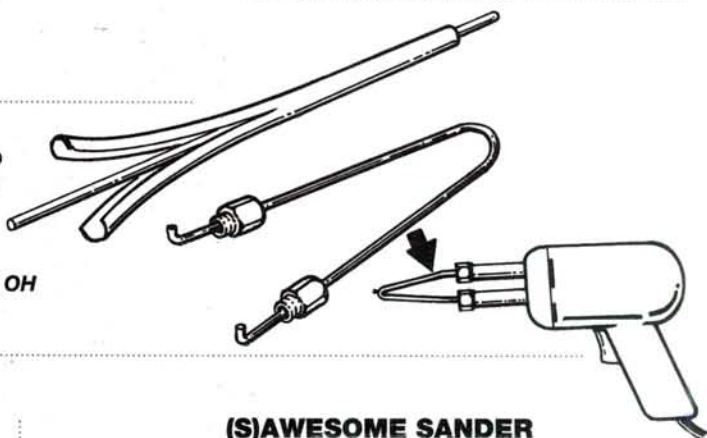
Contact-glue pieces of $1\frac{1}{4} \times \frac{3}{8}$ -inch (30x9mm) lumberyard bull-nose molding (a) to each side of an aluminum T-bar, putting a $\frac{1}{16}$ -inch (1.5mm) balsa shim between them (b). Round off the tops of the grips with a plane and sandpaper, then put self-sticking sandpaper (c) on the bottom.

The grips can be short or full length.
Dave Kovensky, Albuquerque, NM

NEW HOT TIP

Make a new tip for your electronic soldering gun by stripping the insulation off 10- or 12-gauge copper house wire, then bend it to shape and slip on the existing retaining nuts.

Ed Koporc, Cortland, OH



UNPLUGGED HINGE

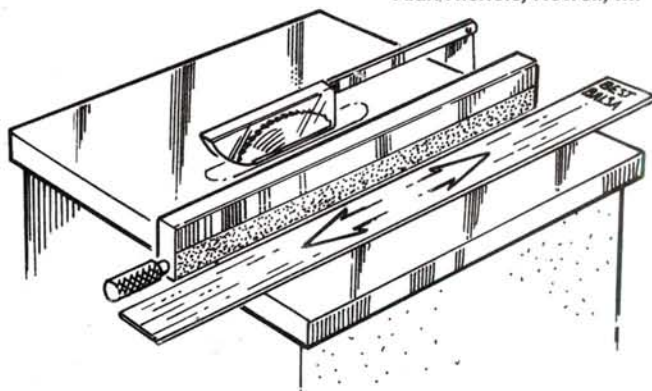
Sharpen a brass tube on the inside, file teeth around the edge, then place it in a drill chuck. Use this slow-turning hole saw to cut closely around broken hinges of the type shown (a). Glue a balsa plug (b) in the resulting hole, then re-drill for a new hinge.

Eugene Waters, Oak Ridge, TN

(S)AWESOME SANDER

To straighten the edges of balsa sheets and get them ready for butt gluing, put a self-adhesive sandpaper strip on the back of the saw table rip fence, then rub the edge of the sheet balsa against it.

Alan Nichols, Howell, MI



UNLIMITED SCALE RACING ASSOCIATION

USRA

WORLD CHAMPIONSHIP FINALS

Story and photos by DEBRA SHARP

Pushing the envelope in Rialto

Ben McBride's Ace Weeks Special heads toward pylon 1. This model has been rebuilt three times following three disastrous crashes; it placed fourth in the biplane trophy race.

Joe Casey's Northwest Technology Laird Turner Special placed third in Thompson Trophy.



Middle Age Crazy's Hippy Cirelli captured the Thompson Trophy World Championship and first place at Rialto with his scratch-built Caudron C-460.



Bill Cunningham flew his Stiletto to fourth in Rialto's Warbird trophy race.



PRECISION MODELS and expert piloting were fundamental at the '97 World Championship Finals in Rialto, CA. This five-day race in September was the culmination of an incredibly successful, organized season of giant-scale racing and, with a \$25,000 race purse and another \$10,500 earmarked for the Series World Champions, the planes and pilots were pumped up for some serious competition.

Watching unlimited R/C model airplanes tear around the sky at 200mph from a distance is exhilarating, but watching them from the flightline is a surefire way to get your adrenaline pumping. The thunder made by these big engines was so loud at times, it seemed to echo off the nearby San Bernardino mountains, and I caught myself humming along with them more than once. As the very skilled pilots of these monster planes will tell you, the need for speed is contagious!

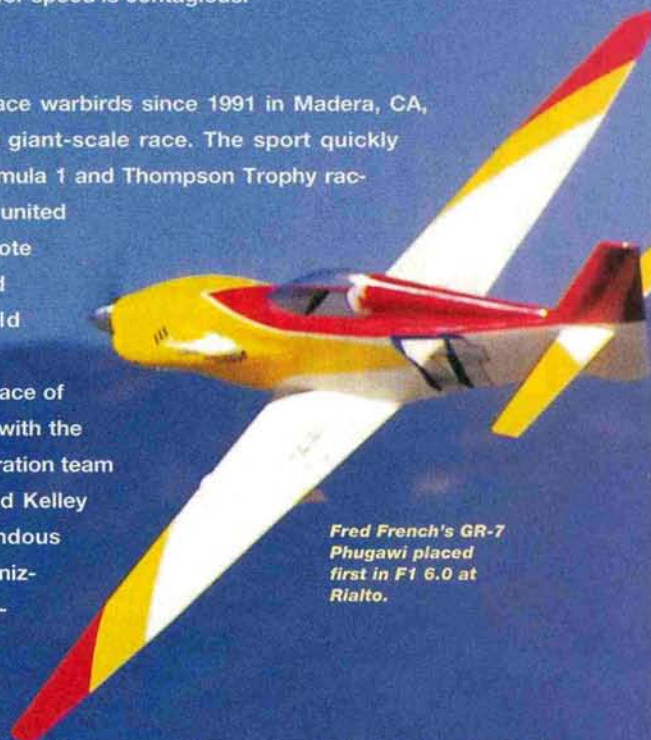
SERIOUS RACERS

R/C'ers have been racing 8-foot-span models of full-size Reno Air Race warbirds since 1991 in Madera, CA, when Tom Easterday and Cliff Adams promoted the first Unlimited giant-scale race. The sport quickly evolved to include other models, including biplanes, AT-6 Texans, Formula 1 and Thompson Trophy racers. Racing these big birds became so popular that in 1994, the pilots united and organized the Unlimited Scale Racing Association (USRA) to promote the sport and standardize the rules and specifications for all Unlimited racing events. USRA is the governing rules body for the World Championship Series of Giant-Scale Air Racing.

Tom Easterday and Archie Snider joined forces to organize this last race of the season, held at the Rialto Municipal Airport in Southern California, with the help of a race administration team

headed by Lorraine and Kelley Easterday. The tremendous efforts of the race organizers, sponsors, volunteers and the USRA itself resulted in a well-run, professional event that highlighted sportsmanship, camaraderie and excitement for the racers and spectators. Everyone at Rialto seemed to know everyone else and, off the field, the masters of speed shared advice, propellers and more than a little good-natured teasing about pilots whose models flew so low they were "plowing ruts."

Racing veteran Archie Snider's Texan shows a bit of attitude.



Fred French's GR-7 Phugawi placed first in F1 6.0 at Rialto.



This GR-7 is the handiwork of the father/son McBride racing team. It's a RacePro kit with an A³ 4.6 in its nose.



Series CHAMPS

Oshkosh Air Races in Oshkosh, WI, in August and ended back in Rialto in September for the World Championship Finals. Pilots won points at each series race by finishing first through fifth in their heats, with a bonus point added for placing first in a trophy race. The best scores from three out of the four series races were added to select the top competitor in each class. When the dust had settled and the scores had been added, each world champion was awarded \$1,500 and a World Championship ring and trophy.



AT-6 TEXAN

Fred Sattler of San Jose, CA, and his DLD model battled in the largest class in the USRA unlimited circuit to win the title of world champion. Fred competes with the AeroSport Racing team.

FORMULA 1 6.0

Consistency paid off for Charlie Powell of Ft. Worth, TX, and his Polecat, which captured the Formula 1 6.0 crown by placing in one of the top five spots throughout the circuit. An Air Hobbies engine and Futaba radio helped bring the Ed Rankin design to the winners' circle.

The road to the World Championship began in Rialto, CA, at the Golden State Unlimited races in April, moved to Gainesville, TX, and the Lone Star Unlimited in June, then to the EAA

What does it take to be a world champion in Unlimited R/C airplane racing? It helps to have a well-built, sleek model with a ton of horsepower up front and rugged, reliable gear, but to win the champion's crown, you need all that *and* a confident pilot who has quick thumbs and an experienced team to support him.

BIPLANE

Kent McKenna and his Laid Back racing team hail from Bell Gardens, CA, and boast they've never lost a single heat with their Long Gone Mong, a KT Aviation model that's powered by an Aerrow 75 RSS engine and controlled with Futaba equipment. The fast biplane is appropriately dressed in the colors of In-N-Out, a fast- (pun intended!) food restaurant on the West Coast.



This RnR Lancair is piloted by Rick Schrameck of San Jose, CA. The model weighs 34 pounds and sports an Aerrow 200 engine.

START YOUR ENGINES

The breathtaking San Bernardino mountains were a perfect backdrop for the high-speed action around the two pylons, which were positioned 1,600 feet from each other. Each heat race lasts for six complete laps around both pylons, and starts and finishes at a line between them. Before the start of the race, each pilot and race plane is assigned a color that corresponds to a light mounted in each pylon. The turn-caller crews, who are stationed a safe distance in front of each pylon, keep a close eye on their designated plane and press a hand-held button as the model passes the pylon; this turns on the corresponding light so the pilot and his turn caller on the flightline know when to "turn left."

At the start of each heat, five planes and their teams line up on the

Cashing in at Rialto

\$25,000 total cash purse*

AT-6

1st	\$2,000	Fred Sattler
2nd	\$1,250	Dave Cowan
3rd	\$1,000	Sam Stephens
4th	\$500	Joe Marine
5th	\$250	Robert Holik

BIPLANE

1st	\$1,200	Kent McKenna
2nd	\$800	Tim Cardin
3rd	\$500	John Lockwood

FORMULA 1 4.6

1st	\$2,000	John Creagh
2nd	\$1,250	Mike Adams
3rd	\$1,000	Scott Manning
4th	\$500	Bill Malo
5th	\$250	Ken Thornton

SR AMPIONSHIP FINALS



Pilot Mike Adams of Bad Moon Racing talks to a team member before a heat. The GR-7 placed second in the Formula 1 4.6 trophy race and won the People's Choice award for its gorgeous color scheme.

runway and fire up their engines. The sound that comes from five giant-scale powerplants is unbelievably powerful; you can even feel the vibrations with your feet. The models line up and take off one at a time, circling the pylons until all are in the air and the start clock begins its 1-minute countdown. The pilots jockey for position; each wants to be as close as



Mike Adams piloted this Eaton P-51 Strega to second place in Warbird at Rialto. This marked the fourth season for the plane, which weighs 38 pounds and is powered by a Husky 8.4 engine.

possible to the start line—without crossing it—before the air horn sounds. The penalty if this happens? The pilot “earns” additional time, which is added to his final time. Pilots are also penalized for turning before they’ve reached a pylon. In races that are measured in hundredths of a second, a start or pylon cut can mean the difference between earning first or last place.

Fred Burgdorf's RacePro AT-6 is ready for takeoff.



Series CHAMPS



UNLIMITED SUPER

The Supers are undoubtedly the fastest Unlimited racers, and Archie Snider and his RacePro Lancair IV stayed on top throughout the circuit to win the championship. An A3 8.8 engine and Futaba radio help to keep this Lancair ahead of the pack. Archie also races with the AeroSport team.

UNLIMITED WARBIRD

David Smith of La Brea, CA, captured the heavy metal crown with his Team Extra Stiletto—a Hobby Barn model powered by a Quadra engine. David races with Team Extra.



THOMPSON TROPHY

Hippy Cirelli of Ft. Worth, TX, and his crew say they're just “Middle Age Crazy,” but Hippy and his scratch-built

Caudron C-460 had to be just plain fast to become the top dog in this new, unlimited class. The Caudron uses a Husky 4.4 for power, and a JR 347 keeps it turning around those pylons.



FORMULA 1 4.6

The Blues Brothers Racing Team, with their black fedoras and white T-shirts with black ties, are a familiar sight in unlimited R/C air racing. This year, Ken Thornton of Anaheim, CA, took home the championship with his RacePro GR-7 model, which is powered by a Laski-modified Quadra 445 and controlled by an Airtronics radio.

FORMULA 1 6.0

1st	\$600	Fred French
2nd	\$400	Hippy Cirelli
3rd	\$250	Charlie Powell

THOMPSON TROPHY

1st	\$600	Hippy Cirelli
2nd	\$400	Jerry Bradley
3rd	\$250	Joe Casey

SUPER UNLIMITED

1st	\$2,500	Bill Cunningham
2nd	\$1,500	Archie Snide
3rd	\$1,000	Bob Smith

UNLIMITED WARBIRD

1st	\$2,500	Ken Thornton
2nd	\$1,500	Bill Cunningham
3rd	\$1,000	Bruce Brown

An additional \$900 was awarded to Saturday's heat winners.



This RacePro Texan is piloted by 24-year-old Robert Holik, who was named "Rookie of the Year." Robert is a member of the AeroSport team and learned to fly R/C only a year ago; he placed fifth in the AT-6 trophy race at both Lone Star and Rialto.

Rules of the Game

STOCK TEXANS. The AT-6 class combines 1/5-scale Texans and stock Zenoah G-62 engines. The models must weigh between 27 pounds (dry) and 40 pounds (wet) and have retractable landing gear. The racers must also have a clear canopy with a 1/5-scale pilot inside and a side air scoop. Mufflers can't be longer than 8 inches, and tuned pipes aren't allowed. In keeping with the "stock" theme of this class, promoter-supplied propellers and fuel are mandatory.

TWO ARE BETTER THAN ONE. All models in the Biplane class must be scale representations of a full-scale biplane approved by USRA, including Bucker Jungmeisters, Christen Eagles, Imperial Knight Twisters, Mongs and Weeks Specials, with a 1/5-scale pilot bust in the cockpit. The pipes are also required to have a minimum wing area of 1,460 square inches (top and bottom wing combined) and weigh between 18 pounds (dry) and 28 pounds (wet). Engines for models in this class cannot be larger than 4.6ci and must be enclosed,

and tuned pipes or special exhaust systems are allowed. The biplanes' landing gear must be fixed and have wheel pants, and tail wheels must be steerable.

42-PERCENT SCALE.

A Formula 1 class race plane must be a 42-percent scale version of a full-size aircraft that has qualified to race at the Cleveland National Air Races or the Reno National Air Races; these include GR-7s, Polecats and Shoestrings. Because there are so many racers that can be modeled, pilots need to have 3-views and scale dimensions available during the technical inspection of the model. The class calls for a minimum wing area of 1,675 square inches and a weight of between 25 pounds (dry) and 40 pounds (wet). These racers must have a scale pilot figure and fixed landing gear with wheel pants, and no tuned pipes or special exhaust systems are allowed.

In 1997, Formula 1 class models raced in either 4.6ci or 6.0ci engine categories. USRA members will vote May 1 to standardize the class

engine size for the 1998 race season.

GOLDEN AGE RACERS.

Thompson Trophy race planes are designed to be competitive, based on a scale-factoring method in which the wingspan and total fuselage length added together must equal 156 inches. Examples of Golden Age (1929 to 1939) racers include Wedell Williams, Caudron C-460s, Howard Ikes and Mikes, and Laird Turner Specials. The models must weigh between

22 pounds (dry) and 40 pounds (wet) and be powered by a 4.6ci engine with a pipe that's no longer than 8 inches. Engines in these models must be enclosed, and no special exhaust systems are allowed. Landing gear must look scale and a pilot bust, see-through canopy and three scale gauges on the instrument panel are required. Scale paint schemes aren't necessary but are encouraged, and pilots need to have 3-views available during technical inspection.

HEAVY METAL ACTION.

Models in the popular Unlimited Warbird class must be scale representations of full-size warbirds that are qualified to race in the Reno National Championships Air Races or other scheduled Unlimited races. This class includes P-51s, P-38s, Bearcats and Corsairs. The models must have a wingspan of at least

100 inches (single engine) or 112 inches (twin) and weigh between 25 pounds (wet) and 55 pounds (dry). The powerplant(s) can weigh up to 14 pounds (9.5 pounds each for twins) and may be exposed, but landing gear must be retractable and look scale, and the model must have a steerable—though not necessarily a retractable—tail wheel.



Joe Marine (center) of RacePro fame shares a happy moment with members of the Bad Moon Racing Team. Nearly 40 percent of all the models flown at Rialto were built from RacePro kits.

"SUPER" FAST.

USRA created the Super Unlimited class with provisional

rules for 1997. In a nutshell, this class is open to any aircraft as specified by the previous class rules and specifications, with the exception that Thompson Trophy racers who compete in this class must have at least 1,060 square inches of wing area. In 1997, the Super class was open to any airplane that was bigger than the models in the class it would usually race in, e.g., any 42-percent Formula 1, Unlimited Warbird, etc., may race in the Super Unlimited class if it fits the specs for its class or is larger than the specs allow. As with the Unlimited Warbird class, engines cannot weigh more than 14 pounds (or 9.5 pounds each for twins). Lancairs and Pond Racers must race in the Super class and, this year, the Super Unlimited class was dominated by Lancair models.



The PIC racing team preps Kevin Norred's DLD Texan for an upcoming heat race.

W I N N E R S

Place Tail no. Name Team Plane Kit Engine Radio Weight (lb.)

■ AT-6

1	2	Fred Sattler	AeroSport	AT-6	DLD	Zenoah G-62	JR	29
2	62	Dave Cowan	TEAMAUI	AT-6	RacePro	Zenoah G-62	JR PCM	27
3	443	Sam Stephens	TEAMAUI	AT-6	RacePro	Zenoah G-62	JR PCM	27
4	333	Joe Marine	RacePro/Blues Brothers	AT-6	RacePro	Zenoah G-62	JR PCM	27
5	17	Robert Holik	AeroSport	AT-6	RacePro	Zenoah G-62	JR PCM	27

■ Biplane

1	88	Kent McKenna	Laid Back	Long Gone Mong	KT Aviation	Aerrow 75 RSS	Futaba	24
2	3.14J	Tim Cardin	Blues Brothers	Pitts S-2	Scratch-built	Laski 445	Airtronics	24
3	616	John Lockwood	L&L Racing	Mong	Scratch-built	Aerrow 75	Futaba	22
4	11	Ben McBride	McBrides Racing	Weeks Special	Ace	Quadra 4.4	JR	26
5	76	Fred Sargent	—	—	—	—	—	—

■ Formula 1, 4.6

1	139	John Creagh	West Coast Racing	Kelly F1-D	—	—	—	—
2	16	Mike Adams	Bad Moon Racing	GR-7	RacePro	Zenoah 445	JR	27
3	41	Scott Manning	BS Racing	Polecat	BS Racing	Zenoah 445	Futaba	25
4	3	Bill Malo	BS Racing	Polecat	BS Racing	Zenoah 445	Futaba	27
5	3.14	Ken Thornton	Blues Brothers	GR-7	RacePro	Laski Z445	Airtronics	26

■ Formula 1, 6.0

1	17	Fred French	Phugawi	GR-7	RacePro	Aerrow 100	Futaba	30
2	69	Hippy Cirelli	Middle Age Crazy	Shoestring	RPN Racing	Brisson 5.8	JR X-388	30
3	9	Charlie Powell	Solo Pilot	Polecat	Ed Rankin	Air Hobbies 6.0	Futaba	29.5
4	96	Dan Engelhoff	TEAMERICA	Ole Tiger	Scratch-built	Aerrow 100 RS	Airtronics	30
5	21	Mick Crawley	AeroSport	GR-7	RnR	A ³ 5.7	JR PCM	29

■ Thompson Trophy

1	69	Hippy Cirelli	Middle Age Crazy	Caudron C-460	Scratch-built	Husky 4.4	JR X-388	24
2	8	Jerry Bradley	Middle Age Crazy	Keith Rider R-6	Scratch-built	Husky 4.4	Futaba	25
3	29	Joe Casey	Oblivion	Laird Turner	N.W. Technology	Quadra 75	Futaba	30
4	55	Ray Thompson	Middle Age Crazy	Brown's B-2	Scratch-built	Husky 4.4	JR 347	25
5	99	Steve Ehlers	Middle Age Crazy	Caudron C-460	Scratch-built	Husky 4.4	Futaba	24

■ Unlimited Super

1	888	Bill Cunningham	A ³ Unlimited Racing	Lancair IV	RnR	A ³ 11.4	Futaba	28.75
2	191	Archie Snider	Team AeroSport	Lancair IV	RacePro	A ³ 8.8	JR PCM 105X	29
3	316	Bob Smith	Bob Smith Industries	Lancair	RnR	A ³ 8.8	Futaba	32
4	1	Richard Verano	Quickturn	Lancair	RnR	Aerrow 200	Futaba	34
5	381	Daniel Goldberg	Goldberg Racing	Lancair	RnR	A ³ 8.8	Futaba	30

■ Unlimited Warbird

1	15	Bruce Brown	Brown Boys Racing	P-51 Stiletto	Scratch-built	A ³ 8.8	Futaba	34
2	16	Mike Adams	Bad Moon Racing	P-51 Strega	Eaton	Husky 8.4	JR	38
3	3.14	Ken Thornton	Blues Brothers Racing	NA-50	RacePro	Aerrow-Laski 200	Airtronics	33
4	888	Bill Cunningham	A ³ Unlimited Racing	Stiletto	—	A ³ 11.4	Futaba	30
5	91	Archie Snider	AeroSport	NA-50	RacePro	A ³ 8.8	JR PCM	29

At the end of the heat, pilots are assessed any cuts and then earn points according to how they placed; after all the heat races, the points are tallied to determine the top five contenders, who race against one another for their class trophy. It's interesting to note that the model with the fastest time doesn't necessarily get to compete for the trophy; in giant-scale racing, consistently placing third, for instance, may earn a spot in the trophy race, while earning a record-breaking time in one heat and failing to place in the others will keep you on the sidelines.

A WINNING COMBINATION

Technology, skill and cooperation—both nationally and at the team level—account for the success and

popularity that giant-scale racing enjoys today. Each airplane on the field is an extraordinary fusion of scale engineering and power and the product of countless hours of painstaking labor. Competitions like the World Championship Finals at Rialto are a time for racers and manufacturers to compete and test their building, flying and design expertise—to push the speed envelope as far as they possibly can. When they aren't racing, unlimited giant-scale supporters are busy working with USRA to organize more events and streamline its rules and procedures to ensure a solid future for their sport.

If you'd like to learn more about giant-scale racing, contact USRA at P.O. Box 1801, Sugar Land, TX 77487-1801; (281) 558-4191. ✦

USRA World Championship Series Sponsors

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ISC International
JR
Lanier RC
Quickturn Technologies
RacePro Engineering
RnR Products
Zap (Pacer Technology)

AIRCRAFT TYPE

Biplane

3 Long Gone Mong
2 Knight Twister
1 Pitts S-2
1 Team Extra
1 Ultimate BiPe 10-200
1 Weeks Special

Formula One

11 GR-7
6 Kelly F1-D
5 Polecat
2 Nemesis
1 Cassuit
1 Cosmic Wind
1 Ole Tiger
1 Shoestring

Unlimited Super

6 Lancair
2 Lancair IV

Unlimited Warbird

4 Stiletto
2 Tsunami
2 NA-50
1 Fiat G-59
1 Strega
1 Super Corsair

Thompson Trophy

2 Caudron C-460
1 Brown's B-2
1 Keith Rider R-6
1 Laird Turner

KITS AT THE WORLD CHAMPS

28 RacePro
11 RnR
5 Saxton
4 DLD
3 Horn Dog
3 R&S Racing
2 Bel Custom Aircraft
2 BS Racing
2 Byron
2 Ed Rankin
2 RPN Racing
2 Zimpro
1 Ace
1 DCU
1 DW
1 Eaton
1 Hobby Barn
1 KT Aviation
1 N.W. Technology
1 Paul Steiner

HEAVY-DUTY HARDWARE

Radios

39 JR
38 Futaba
9 Airtronics
4 Hitec

Engines

21 Quadra
15 A³
10 Zenoah (G-62 used in all Texans)
6 Husky
4 3W
4 Herbrandson
1 Air Hobbies
1 Brison
1 J&K
1 Mathe

Sailplanes Unlimited

Wilga 35

1/4-scale German towplane



by SAL IASILLI

THE WILGA 35 is a Polish general-purpose aircraft with STOL (short takeoff and landing) performance. On June 24, 1967, the Wilga 35 made its first flight, and the following year, it was chosen as the official towplane of the '68 World Soaring Competition held in Poland. Its Fowler flaps, wing slats and powerful engine give it the ability to take off and land in just over 50 feet, making it one of the most desirable towplanes in Europe—even today. The same holds true for the popularity of this 1/4-scale model, which is manufactured in Germany by Frisch-Modellbau. It is imported to the U.S. by Sailplanes Unlimited*.

THE MODEL

The kit contains a white gelcoated epoxy/glass fuselage and cowl with all the panel lines and many scale features molded in. The wings, flaps, ailerons, rudder and elevator are all Obechi-covered Styrofoam. The wings also have the spars and wing-blade retainers built in at the factory. The scale aluminum landing gear is machine made and has functional, shock-absorbing wheel struts. The windshield and side and top windows are molded in lightly tinted, heavy-gauge Lexan plastic. The main wheels, scale

tailwheel assembly, decals, construction manual with drawings and hardware package are all included.

FUSELAGE CONSTRUCTION

Even though the construction manual is in German, the detailed drawings show the parts and part numbers, so it's very easy to understand. The windshield and window openings have to be cut free from the fiberglass fuselage to accommodate the molded Lexan windows, which are attached with silicone and bolted into place after the main assembly is complete. I used a Dremel tool with a

disk-cutter attachment and carefully cut close to the window lines molded in the fuselage. A drum sander attachment on the Dremel was used to finish off the final openings. After all the window openings had been cut free, the balsa and plywood cabin-support structure shown in the drawings was then attached with Z-Poxy* and glassed to the inside of the cabin area and aft of the firewall. This consisted of installation of the cabin supports, the windshield "V" dowel supports, the fin post, the tailwheel mount and the fuselage endcap. This added needed

strength to these high-stress areas.

The landing-gear slots, which are molded into the lower cabin area, also need to be cut open to accommodate the right and left aluminum landing gear. The gear legs must be carefully aligned to each other, and three holes are then drilled through the gear and the 5mm plywood gear mount as shown in the drawings. I used 8-32 machine screws and blind nuts to secure the gear to the mount. When all is aligned, remove the gear and Z-poxy and glass the gear mount to the fuselage walls and to the lower bulkheads. The gear will be re-installed after the fuselage has been completed.

WING AND TAIL ASSEMBLY

Because the factory has already sheeted the wings, stab, elevator and rudder with



From any angle, the Wilga's distinguished looks are instantly recognizable.

Obechi and installed the spars, all that is needed to complete the wings and tail assembly is to glue and shape the leading and trailing edges, add the end tips, glue and sand the facings on the control surfaces and sand the sheeted surfaces

for covering. The wings are secured to the fuselage with two steel blades that enter two brass mounting channels at the wing-root fuselage cabin. The two indicator marks on each side of the fuselage wing root need to be cut open to

SPECIFICATIONS

Model: Wilga 35

Type: scale high-wing towplane

Manufacturer: Frisch-Modellbau (imported by Sailplanes Unlimited)

Wingspan: 109 in.

Length: 78 in.

Weight: 22 to 26 lb. (review model —26 lb.)

Engine req'd: G62 to 3W70 or equivalent

Engine used: 3W 70

Radio req'd: 8-channel

List price: \$1,095 (plus shipping)

Features: a nicely made, white, gelcoat fiberglass fuselage with many scale features molded in; rugged, scale, functional, shock-absorbing wheel struts and heavy-duty, machine-formed aluminum landing gear; Obechi-covered Styrofoam wings, stab, elevator and rudder; thick-gauge, tinted, molded windshield and windows; illustrated construction manual; hardware package that includes tailwheel and tailwheel assembly; two 4 1/2-inch main wheels with inflatable valves; and a Mylar decal sheet.

Comments: the kit is not difficult to build because most of the major composite components are handmade at the factory, but a fair amount of time is required to complete the model. This kit is for intermediate to experienced builders and pilots.

Hits

- Very good workmanship.
- Fidelity to scale.
- Excellent flying characteristics.
- Extremely broad speed range.

Misses

- Only two Fowler flap hinges per flap were provided.
- The instruction manual is in German (but the kit can easily be built from the detailed drawings in the manual).

FLIGHT PERFORMANCE

one and asked if I would like to try flying his. I jumped at the opportunity. The Wilga was more stable than my 1/4-scale Cub and more responsive to aileron control, with no bad habits at all—a sheer delight to fly.

The following flight-performance evaluation is from John Derstine's personal experience with three Wilgas. The flying control throw setup is as follows: ailerons—25 degrees plus, 15 degrees minus; flaps—maximum 90 degrees deflection with elevator compensation programmed; elevator—20 degrees plus, 20 degrees minus; rudder—45 degrees each way.

• Takeoff and landing

There are many ways for the Wilga to take off, depending on the weight of the sailplane you are towing. For an 8- to 9-pound sailplane, using 1/2 throttle, a little right rudder and 20 degrees flaps will have the Wilga airborne within moments after the glider has lifted. With a heavier, 16- to 20-pound glider, full throttle, 20 degrees flaps and a little more right rudder are required.

My first experience flying the Wilga was at the second annual aerotow in Elmira, NY. John Derstine knew I was building

For landings when there is no wind, when the Wilga is approximately 100 feet off the end of the runway, apply 90 degrees of flaps and point its nose down slightly. The Wilga will slow down to a crawl. Prior to touchdown, retract the flaps or the Wilga will balloon. If there's strong wind, no flaps at all are used for landing. Crosswind landings require a lot of rudder and aileron compensation to keep the wings level on touchdown.

• Low-speed performance

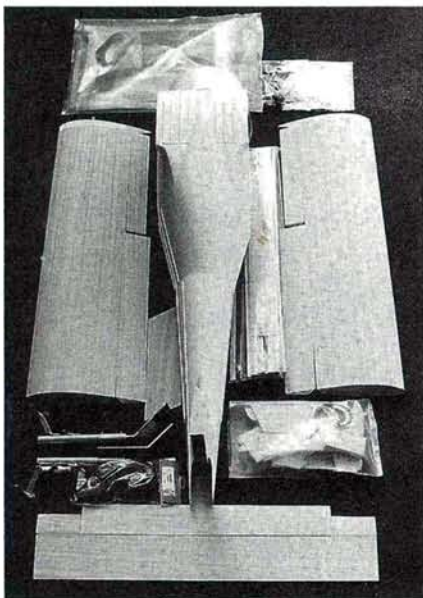
For super slow speeds, 25 degrees flaps should be applied. If you have a computer radio, 3 degrees down-aileron should also be applied. The Wilga will slow down to approximately 7mph with no tendency to tip-stall at all.

• High-speed performance

Top speed of the full-scale Wilga is 125mph. With the 3W 70 twin engine, the Wilga is over-powered. So, at full throttle and when it's not towing a sailplane, the Wilga performs like a pattern ship, flying 70 to 80mph with a slight tendency to climb but steady as a rock. Again, control response is stable and predictable. Scale high-speed flying should be approximately 31mph.



accommodate the two brass channels. When I inserted the brass channels into the two fuselage slots, I had to file the slightly oversize channels to make them flush with the fuselage sides. To accommodate variations in construction, the steel blades are



The complete kit—everything is neatly packaged.

supplied slightly oversize and must be cut after the wings have been fitted to the blades and fuselage. I had to remove approximately 1 inch from each steel blade for a perfect fit to the fuselage.

An alignment dowel is fitted to the rear of the wing and aligned to the rear of the cabin. To secure the wing to the cabin, an eyelet is inserted just behind the wing rods and is

secured inside the fuselage with a spring. When the wings were perfectly aligned to the fuselage, I used some Zap* inside the cabin to keep the brass channels properly aligned. I then removed the wings and steel blades and installed the sandwich assembly to the two brass channels; this assembly consists of ply and balsa sandwiched together with epoxy as shown in the drawings. This is the main support of the wings to the fuselage and is therefore crucial.

The kit contains four Fowler-flap hinges—two for each flap. For additional security, I added a third hinge to each flap. These specially designed Fowler hinges are available through the Hobby Lobby* catalog. I used four Du-Bro* 1/4-scale hinges for each aileron and six on the elevator. The rudder was attached to the fin with two 3mm plywood standoffs. A 1/16-inch music wire runs through the leading edge of the rudder into the two standoffs,

enabling the rudder to be removed, if necessary. The lower part of the stab is epoxied to a pre-shaped balsa mount and is fitted into the fuselage saddle. Two 4-40 bolts run through this assembly to secure the stab to the fuselage. For added structural support, two brass tube struts are mounted to the lower part of the stab and to the rear endcap of the fuselage. The complete stab assembly is also removable.

ENGINE AND RADIO INSTALLATION

The 3W* 70 twin engine that I mounted in the Wilga is about the largest engine that would fit into its huge radial cowl. Each cylinder just clears the inside of the cowl. The cowl is mounted to the fuselage with five 8-32 nylon bolts, three at the top rear near the windshield and two at the bottom rear toward the firewall. I needed a 1/2-inch-thick plywood engine backplate to achieve an 1/8-inch prop-to-cowl clearance when the



The huge radial cowl can accommodate a twin engine as large as the 3W 70.

SAILPLANES UNLIMITED WILGA 35

engine was fitted. Normally, I mount my engines with 0 degrees downthrust and 0 degrees right thrust, but the Wilga required 2 degrees downthrust and 2 degrees right thrust to maintain straight and level flight.

To secure the engine to the 1/2-inch back-plate and firewall, I used 1/4-20 machine bolts and blind nuts. The fuel tank is mounted above the landing gear plywood floor, putting it at the center of the CG location. I mounted two 1/4-scale servos, one in front of the other, approximately 3 inches to the rear of the plywood floor

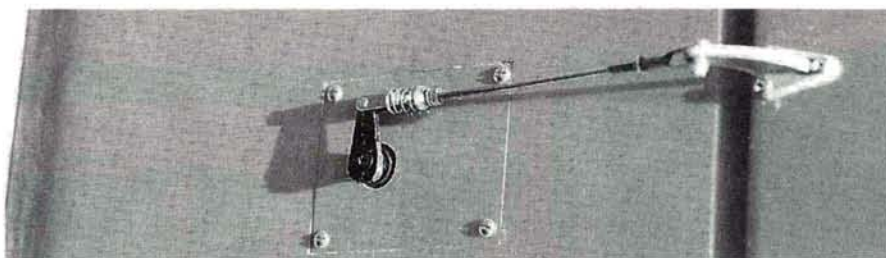


The necessity for wing struts is eliminated because of the model's strong wing structure.



The tow release protrudes from the center of the cabin hatch.

mount. The front servo, which is mounted slightly higher than the rear servo, activates the elevator by means of a fiberglass pushrod and 4-40 spring-loaded Du-Bro Quick Links. The rear servo activates the rudder and the tailwheel with the use of 35-pound-test, nylon-coated, steel fishing-line leader cable. Since the rudder is set so high up from the tailwheel assembly, each requires its own two pull/pull cables, which means that four cables are connected to the rear servo control arm. It may seem compli-



The aileron servo hatch and pushrod attached to the Robart ball link control horn.

cated at first, but it is a very simple and effective system that works well.

Four high-torque metal gear servos are installed in the wing panels, one for each flap and one for each aileron. Robart* ball-link control horns were used on the flaps, ailerons and elevator. Standard servos were used for the throttle and aerotow release mechanism. The throttle servo is mounted just behind the firewall, and the tow release servo is mounted to the rear of the wing spar joiner assembly, which is at the CG location.

FINAL FINISHING

The molded windshield and side and top windows have to be cut free from their molding trays with a Dremel disk cutter. Use a thin bead of silicone placed at the outer edge of each window panel to attach them to the inside of the fuselage cabin, and hold them in place with masking tape. When the silicone has cured, drill and install the 1.9mm nuts and bolts provided in the kit 2 inches apart around the windshield frame and 2 3/4 inches apart around the side and top windows. The installed windshield and windows add the final structural strength to the cabin area.

The wings, stab, elevator and rudder are covered with Ultracote*. All the trim colors on the fiberglass fuselage are Chevron's* Perfect Paint, which is computer-matched to Ultracote True Red. A light sanding with 320-grit sandpaper was required for the paint to adhere to the gel-

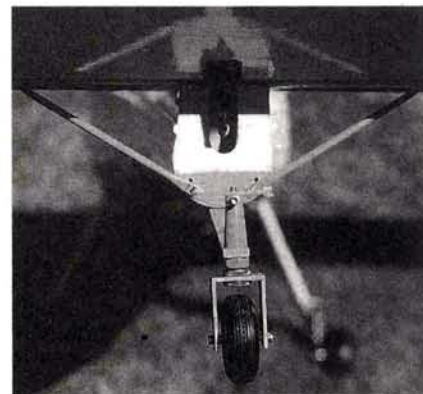


The rudder is attached to the fin with two 3mm ply standoffs; two 4-40 bolts secure the stab to the fuselage.

coat of the fiberglass fuselage. I used Bob Bank's Scale Model Research* Foto-Pak of the Wilga for my scale color-scheme layout. All the large Wilga lettering on the Mylar sheets provided with the kit was sent to Vinylwrite* and made into individual, computer-cut lettering that is very thin and appears to have been painted on.



Scale functional wheel struts dampen the hardest of landings.



The tailwheel assembly and stab support struts are functional.

CONCLUSION

In the last few years, the popularity of aerotowing has had a significant effect on the number of people building and flying large-scale sailplanes. The need for a good, rugged towplane such as the Wilga with its super-stable flying characteristics have made it the perfect choice of tow pilots worldwide. I am so pleased with the Wilga that I am building a second one that will feature a full-scale cabin interior. I may even enter it in scale competition!

*Addresses are listed alphabetically in the Index of Manufacturers on page 118.

A new look for the Rhinebeck Jamboree

31 YEARS AND STILL GOING STRONG



The Ziroli-designed Fokker Dr. I triplane is a very popular entry at the Rhinebeck Jamboree.

One of the more unique entries was this Curtis A3B Falcon, built and flown by Stan Clark. The 45-pound biplane is powered by a Sachs 4.2 gas engine and was built from Effinger plans.





This Ryan STA is the work of Canadian Jean Chevalier. Jean has been a regular at Rhinebeck for many years.

by GERRY YARRISH

HAVING GROWN UP in New England and having been interested in aviation and R/C models, it is only natural that I have spent many sunny weekends at that magical place in Rhinebeck, NY, known as the Old Rhinebeck Aerodrome. My father, being an old-time R/C'er, started taking me to the aerodrome when I was just a kid (long before I started flying R/C models). I literally grew up with my neck strained backwards watching the old biplanes engage in slow-motion dogfights and drop their bombs on the hapless characters below. As I grew up, Cole Palen (the Black Baron) and Dick King (aka Sir Percy Goodfellow) became two of my earliest heroes (right up there with Superman and Batman!).



Above: Nick Zirolli's beautiful 1/4-scale Ryan Spirit of St. Louis makes a slow, low flyby during the noontime show.

Below: hey! Move over buddy! A Cub and a Taube try to share the same airspace.

features antique automobiles, motorcycles, early engines and memorabilia dating from 1900 to 1935. Several hangars display Cole Palen's amazing collection of aircraft and recently, a new museum building was built.

The weekend airshows re-enact the early years of aviation. On Saturday, the airshow displays the history of flight, with

pioneer, WW I and Golden Age-era aircraft taking to the skies. On Sunday, the airshow features WW I and barnstorming aircraft and the world-famous antics of the evil Black Baron of Rhinebeck. During the week, the museum is open and the airshow aircraft are on static display. Group tours are available and you can get biplane rides if you're

daring enough. The aerodrome is open every day from May 15 through October 31 and the weekend airshows begin in June and continue until October.



RHINEBECK JAMBOREE



RHINEBECK AERODROME AEROPLANE COLLECTION

The Rhinebeck Aerodrome has collected, restored, built and flown more airplanes from the first 30 years of aviation history than any other museum in the world. Its antique aeroplanes from the Pioneer, WW I and the Golden Age eras form one of the largest historically significant aircraft collections to be seen anywhere. That these priceless flying machines are actually flown on a regular basis is a testament to the dedication and hard work of the aerodrome's volunteers.



Above: one of two Fokker Dr. I triplanes at the aerodrome, this is powered by a non-original radial engine. Look out, Snoopy! Left: what better place is there to compare your model Fokker D-VII with the real thing than Rhinebeck? Here, the full-size Fokker demonstrates its slow speed flight characteristics. Very impressive. Below: not a regular at the aerodrome, this beautiful 1918 Sopwith Camel is powered by an original Gnome rotary engine. What a sound! Below (right): this 1910 Hanriot reproduction (flown here by Dick King) is powered by a 50hp Franklin engine. Its controls are similar to those of the original; the right stick controls elevator and the left stick controls wing warping. A button on top of the left stick kills the engine ignition for speed control.



Aircraft flown in the weekly airshows include the following:

- 1909 Bleriot XI
- 1910 Hanriot (reproduction)
- 1911 Curtiss "D" pusher (reproduction)
- 1913 Caudron G3 (reproduction)
- 1914 Avro-504K (reproduction)
- 1915 Nieuport XI (reproduction)
- 1917 Fokker DR-1 (reproduction)
- 1918 Curtiss Jenny JN4H
- 1918 Fokker D-VII (reproduction)
- 1929 Davis D1-W
- 1929 New Standard D-25
- 1931 Great Lakes Trainer
- 1936 Aeronca C3
- 1942 Fleet Finch 16B
- 1936 Taylor E-2

The Rhinebeck airshow also features these privately owned aircraft:

- 1929 Travel Air 4000 Speedwing (John C. Barker, owner)
- 1931 Waco RNF (Pamela Barker, owner)
- 1940 deHavilland Tiger Moth (William King, owner)
- 1945 Stampe SV4B (Gene DeMarco, owner)
- Fokker D-VIII (Brian Coughlin, owner)



A CHANGE IN TACTICS

For the last 31 years, the Mid-Hudson Radio Control Society has put on the Old Rhinebeck WW I R/C Jamboree. The 1997 Jamboree, held on September 6 and 7, had a change in format. Instead of the traditional competition weekend consisting of AMA Sport Scale, Maneuvers and Mission events (emphasis placed on the Mission event), the Jamboree became a low-key, no-pressure WW I fly in allowing more breathing room for the scale modelers. As early as the February



Part of the Sunday crowd; doesn't look like the Jamboree is going to end anytime soon.

WRAM show, there were rumblings that this change would be the end of the long established New England competition. I'm pleased that the reports of the Jamboree's death were greatly exaggerated.

What did happen was that a shift occurred for the majority of the models entered. The pendulum swung from intense competition (though a lot of fun) to a kinder, gentler fly-in atmosphere with much less pressure in the air. But the change was not just for the models; the aerodrome itself has been transformed as well.

The Rhinebeck Aerodrome has always had a reputation for being a model airplane eating event. It had a narrow, bumpy runway with trees (serious trees) right in your face. There was always a nasty crosswind, and turbulence was always felt at about treetop level. When we arrived on Friday, it seemed that we were at a new place. To satisfy FAA safety regulations, the aerodrome's runway has been widened to almost twice its old width, the hill and trees that ate so

many models have been removed, and the bleachers have been moved away from the runway's edge to more than double the size of the pit area. What a great place for a fun fly!

In part because of the change in format,

the number of modelers who came was down a bit, but this only made for more flights for those who did show up. For most of the weekend, the wind was right down the runway, and it turned out to be a perfect weekend. The bull's-eye was left

The Spirit of St. Louis

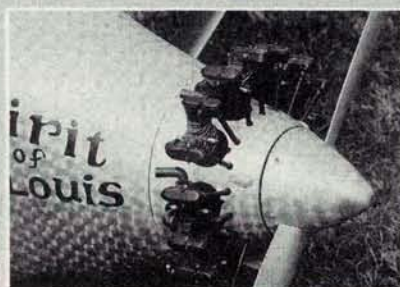
Nick Zirolli Sr. has been a regular at the annual Rhinebeck Jamboree since it was first held. Many of his designs have become closely associated with the event. From his Fokker E-III Eindecker, Taube and Morane Saulnier to his S.E.5a and Fokker D-VII, practically all of his WW I model designs have taken off and landed on that bumpy runway at Rhinebeck.

To commemorate the 75th anniversary of Charles Lindbergh's crossing of the Atlantic, Nick designed and built a 1/4-scale model of Lindbergh's aircraft, and it was an immediate hit at the 1997 Jamboree. The model Spirit of St. Louis was also very popular with the aerodrome staff because a full-size replica of the Ryan aircraft is being built in the new Rhinebeck museum. If you've ever seen the movie "The Spirit of St. Louis" with Jimmy Stewart in the lead role, then you'll appreciate the story behind the aircraft.

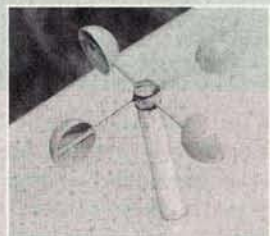
Nick's 138-inch-wingspan model is constructed of balsa, spruce and plywood and is covered with F&M Enterprises' Scale Stits cloth. Nick used Poly Tone paint and included rib stitching and pinked tape detail—all using the Scale Stits process. Power comes from a 4.2ci gas engine, and

the dummy radial engine is duplicated with William Bros. 1/4-scale cylinder heads. The distinctive motor-turned metal paneling on the nose has been faithfully reproduced, as have all the markings and external details. Model Graphics* supplied all the numbers and lettering for Nick's model, and Robart Mfg.* custom-built the landing gear and struts. Nick made his own scale wheels and uses an Airtronics* radio for control.

The all-up weight is approximately 32 pounds, and to improve its appearance, Nick incorporated a slight amount of dihedral into the wing. Set up with the scale flat wing, Nick noted that it looked as if the wing was drooping, thus the minor change from true scale. As can be expected, Nick's Spirit of St. Louis is very easy to fly and is an impressive sight in the air. All that were missing was the Atlantic Ocean and a pesky fly to keep Charlie company.



The engine detail is built up using William Bros. 1/4-scale cylinders. The paneling around the nose is thin aluminum sheet stock glued into place.

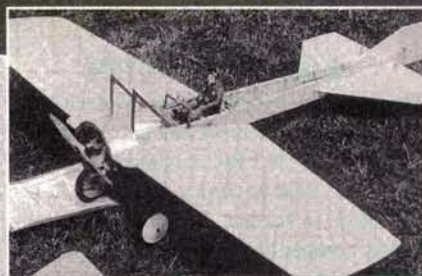


Above: the model is full of intricate detail such as this wind-driven generator mast. Yes, it functions when the model is flying.



Nick and his wife, Janet, show off the newest Zirolli creation—a 1/4-scale Ryan Spirit of St. Louis.

E-nvasion at Rhinebeck



Above: hearing about the E-nvasion, Gerry Yarrish brought along his 1911 Deperdussin built from Vern Zundel plans. Powered by 10 cells and a geared Cobalt 15, the plane has more than enough power. Left: this tiny electric Nieuport 11 was a crowd-pleaser. I think everyone saw himself flying it at the local park, as with its geared Speed 400 motor, it just putts around the sky as a WW I bird should.

by LARRY MARSHALL

For the first time, the Jamboree hosted electric-powered airplanes and their pilots. Martin Irvine and Keith Shaw came to Rhinebeck this year, bringing with them their smiling faces, easygoing dispositions and a lot of expertise in flying electric powered airplanes. And they also brought with them some really nice WW I aircraft—all powered by electric motors. The planes they flew drew considerable attention from the other participants.



This is Martin Irvine's Hanriot HD-1. All of the color and markings were done with MonoKote that was oversprayed with Testors Dulcote. The results are nothing short of spectacular. That's Martin on the left and Keith with the transmitter.



Keith Shaw had to come from Michigan and couldn't bring his air force of large Golden Age racers. But he did bring his Fokker D-VIII sport scale plane. Built from an old Earl Stahl plan, it's a 3-channel machine (hence the extra dihedral in the wing) and is one of the nicest Sunday flyers I've seen.

on the runway for those who wanted to practice bomb drops and spot landings. Also changed was the number of flight stations, which was reduced to four. A traditional impound for radios kept every-

one happy, and no radio problems were encountered.

The fun fly did stop each day so the full-size airshow could take place, and the two flying events certainly comple-

mented each other. A noontime R/C airshow re-enacted the full-size show in miniature and made for a great photo opportunity for the modeler and the general public alike. During the R/C airshow, WW I and Golden Age models took to the air in force. From Fokkers and Albatroses to Stearmans and the Spirit of St. Louis, the weekend was full of R/C eye candy.

Add to this the well-established, full-size airshow with its rare aircraft and the comical melodrama played out by Trudie Truelove, Sir Percy Goodfellow and the dastardly Black Baron and his henchmen, and you have a classic event that only improves with age. If you're an aviation buff and/or R/C modeler and you haven't yet taken in a sunny day at the Old Rhinebeck Aerodrome, you owe it to yourself to go. If you have a wide-eyed youngster, so much the better; you have a built-in excuse to witness the magic that is the Old Rhinebeck Aerodrome.

*Addresses are listed alphabetically in the Index of Manufacturers on page 118.



Right: this unusual WW I design is a German Junkers J-10 designed and built by Dick Allen. Dick was one of the initiators of the first Rhinebeck Jamboree.

Left: this 1/4-scale Fokker D-VII was scratch-built by Bill Killam and is a scale reproduction of the Fokker D-VII in the Rhinebeck collection. Or at least it was After Bill built and painted his model to match the full-size aircraft, the aerodrome staff repainted their full-size Fokker. Good thing for scale documentation.



*All-balsa
aerobat*

Lanier RC EXTRA 3.25

by JIM ONORATO

TO MOST R/C modelers, the aerobatic Extra needs no introduction. It has been around for a few years now in a variety of forms—from full kits to ARFs, from giant scale to .40 size. Rich Uravitch designed a .25-powered version that was the subject of a construction article in this magazine. He called it the Extra 3.25, and now, Lanier RC* offers an all-balsa kit of his familiar aerobat.

THE KIT

This is the fourth Lanier kit I have built. The first three incorporated Lanier's BFPP (balsa, foam, ply and

plastic) concept, which has been used successfully in many of that company's large scale kits. The Extra 3.25, however, is part of Lanier's new All Balsa 21st Century Series and features built-up construction with laser-cut and CNC-router-cut parts. Plastic is used only for the canopy, cowl and wheel pants. Like other Lanier kits, the Extra 3.25 does not contain any hardware but does include a complete list of recommended hardware. The rolled plans are CAD-generated, and the 12-page instruction booklet contains excellent step-by-step instructions.

The Extra 3.25 has been re-engineered



Above: the Extra 3.25 with its big brother, Lanier's 1/3-scale Extra. Both are painted in Patty Wagstaff's 1995 color scheme.



PHOTOS BY WALTER SIDAS & JIM ONORATO



SPECIFICATIONS

Model: Extra 3.25

Manufacturer: Lanier RC Inc.

Type: sport aerobatic aircraft

Wingspan: 47.25 in.

Wing area: 364 sq. in.

Airfoil: semisymmetrical

Weight: 3 lb., 4 oz.

Wing loading: 20.6 oz./sq. ft.

Overall length: 35.5 in.

Radio: 4-channel w/4 standard servos

Engine recommended: .15 to .32 2-stroke or .26 4-stroke

Engine used: O.S. .28F and O.S. .25FP

List price: \$115.95

Features: built-up construction with laser-cut parts; clear plastic canopy; preformed aluminum landing gear; ABS cowl and wheel pants; rolled, full-size, CAD-generated plans.

Comments: originally designed by Rich Uravitch, this pint-size aerobat was reworked by Jerry Smith into a kit-builder's dream. The Extra 3.25 is a joy to build and fly.

Hits

- Excellent aerobatic flight performance.
- Easy-to-follow plans and instructions.
- High-quality laser-cut parts.
- Well-engineered kit.

Misses

- None.

FLIGHT PERFORMANCE

• Takeoff and landing

It was difficult to tell whether the Extra tracked well or not on its first takeoff because it was off the ground in just a few feet. (Later takeoffs with the .25 engine, however, did demonstrate good tracking tendencies.) The Extra climbed out very quickly, and a few minor trim adjustments had it flying straight and level. It had the feel of a much larger airplane, and I was pleasantly surprised to see how smoothly it flew.

After testing the stall characteristics, I decided not to let the plane come in too slowly for landing. The only problem with this was that the Extra didn't want to come down. It had a very shallow glide slope and traveled the whole length of the field before I flared it for touchdown.

• Low-speed performance

The Extra is not the kind of a plane you fly around the sky in a lazy fashion. Even at low throttle, the Extra maintains a pretty respectable speed. This is not a criticism, just an observation. When I checked the stall characteristics, I found that the Extra always fell off to the right when it stalled. I don't try to fly this one really slow.

• High-speed performance

At high speeds, the Extra is a "go where you point it" airplane. It tracks extremely well and is a smooth and stable flier. I did not experience any bad tendencies at the recommended control surface throws, but when I increased elevator throw to do some wild things, the Extra snapped at the top and bottom of high-speed loops.

• Aerobatics

The Extra is a proven aerobatic airplane that's capable of every imaginable maneuver, and the Extra 3.25 holds its own with its larger counterpart. Inside and outside snap rolls were incredibly fast and were done with the plane heading up or down or flying level (it didn't seem to make any difference). Axial rolls were fast and truly axial. Sustained knife-edge and outside 360-degree turns were no problem for the 3.25. Spin recovery was within 1/4 spin when the controls were released (except for flat spins, which took a little longer). Inverted flight required only a little down-elevator.

After the first couple of flights, I increased the control-surface throws, and when I started into a Lomcevak, the plane tumbled so quickly it was hard to tell what it was doing. The .28 engine provided unlimited vertical performance, but even the .25 had sufficient power to haul the Extra straight up for several hundred feet before the plane stalled. I was truly impressed with the aerobatic performance of this airplane!



by Jerry Smith to make it more kit-builder friendly and to provide performance similar to that available with the larger models. Because some sport models get a little squirrely as their dimensions shrink, Jerry used a modified airfoil to tame the Extra's flying characteristics to what an average sport flier could handle.

WING CONSTRUCTION

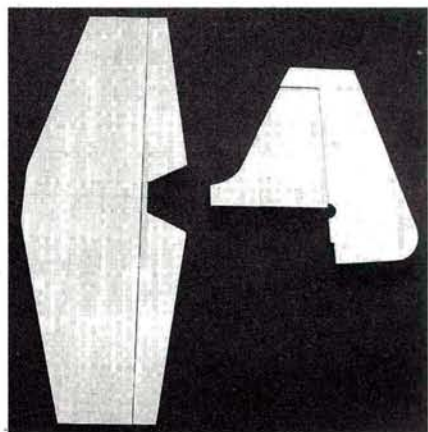
I used Great Planes® 6- and 30-minute Pro Epoxy on the plywood parts and Great Planes Pro CAs on the balsa and plastic parts.

Construction starts with the wing. You can build both wing panels at the same time or just one at a time. I initially chose to build just one so as not to cover the entire wing plan during construction. Building the wing is not difficult, but there are some unique sequential steps that need to be followed to be successful. The leading edge (LE) sheet-

The first test flights and photo shoot took place on a beautiful sunny day with very little wind. The control surfaces were set at the recommended throws and power was provided by an O.S. 28SF.

edge of the LE sheeting. Next, the ribs are glued to the rib caps and the TE. By removing some pins from the spar and letting it "float" as each rib is pushed against the TE, you ensure a snug rib fit and take care of some of the building tolerance usually present. The lower spar is then pinned down and glued to the sheeting with thin CA.

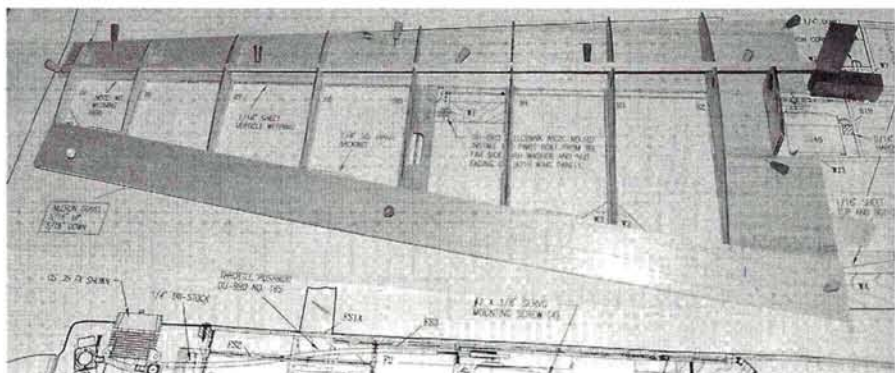
After the upper spar and vertical shear webbing have been installed, the LE sheeting is lifted up against each rib and glued with thin CA. You have to support



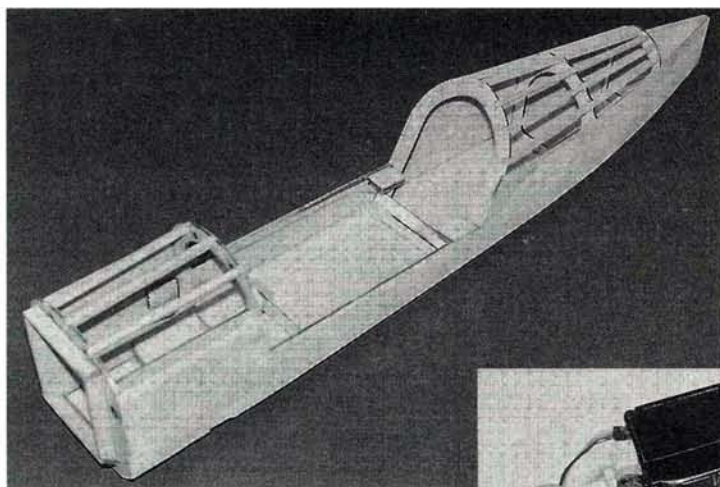
Tail assembly is neat and easy.

the top surface with your thumb while doing this to avoid lifting the structure off the building board. Next, the top LE sheeting is glued to the top spar and the top rib caps are glued to each rib. The top center sheeting is not installed until after the wing panels have been joined. When the glue on the wing panel has completely cured, the panel is removed from the building board and the LE sheeting is pulled against each rib and glued with thin CA. The LE is then glued to the upper and lower LE sheeting after they have been trimmed flush with the ends of the ribs. The wing panels are joined in a manner that is somewhat different from what's found in most kits. Both panels are joined upside-down on a flat surface with a 1-inch block under the root rib TE to

ing, the center section sheeting and the rib caps are first pinned and glued over the plan. Then, using a straightedge, the rib caps and lower center sheeting are trimmed off at the trailing edge (TE), and the TE stock is glued into place. The lower wing spar is then temporarily pinned (but not glued) to the rear



Construction begins with the wing panels, which can be built at the same time or just one at a time over the plans.



Left: the fuselage is completely built up of laser-cut parts. Below: because of space limitations, the servos have to be laid on their sides in this built-up servo tray that's secured in the bottom of the fuselage.

keep the wing level with the building surface. This allows the taper in the wing to act as dihedral on the bottom side. The top side of the wing is flat with no dihedral. There are quite a few steps involved in joining the wing panels, but the instructions are quite clear on how to proceed.

As I continued, it became quite obvious that a lot of thought went into the design of this kit. For example, since the wing is so thin, the aileron servo has to be laid on its side, and that would normally make installation a little tricky. However, the parts directly in front of the servo (WJ1 and WJ2) have holes in them, so you can drill and install the servo-mounting screws. Pretty neat!

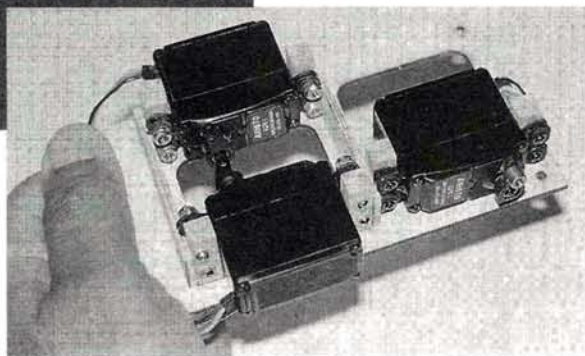
There appeared to be a line missing in step 8 of this section of the instructions. Two bellcrank supports (W1) and the wing hold-down bolt plate (W4) should be installed in this step.

FUSELAGE AND TAIL GROUP

The fuselage is completely built up, and assembly went quickly with the accurate laser-cut parts. My only modification was to add a few extra stringers between formers F1 and F2 to make the area in front of the canopy look a little rounder. Once again, the fine engineering and attention to detail were evident when it was time to attach the wing to the fuse, and I found drill holes already cut into the formers to allow holes for the wing dowels to be drilled from the front.

Mounting the servos was a little different from what I was used to. Because of space limitations, the servos have to be laid on their sides. This is accomplished with a built-up servo tray that's secured in the bottom of the fuse with two screws. This allows easy removal of the tray itself when necessary.

The vacuum-formed canopy is attached to a balsa frame that's attached after the wing has been bolted into place.



The tail surfaces are all 3/16-inch sheet balsa and don't take much time to build. The part numbers referred to in the instruction manual were different from the part numbers shown on the plans, but the assemblies were so simple that parts identification was really no problem. Two supplied parts are used to simulate the stab and fin while you carve the tail fairing blocks. The procedure described in the manual should give you excellent results and makes this job a snap.

FINAL ASSEMBLY AND FINISHING

Installation of the engine, muffler, cowl, landing gear and wheel pants completed the construction. Initially, I used an O.S.*

.28SF for power, but later, I switched to an O.S. .25FP to tame things down a bit. The .28 was just too much power for me whereas the .25 seemed better suited to my kind of aerobatic flying. In both cases, I used a Pitts-style Slimline* muffler that fit entirely inside the cowl.

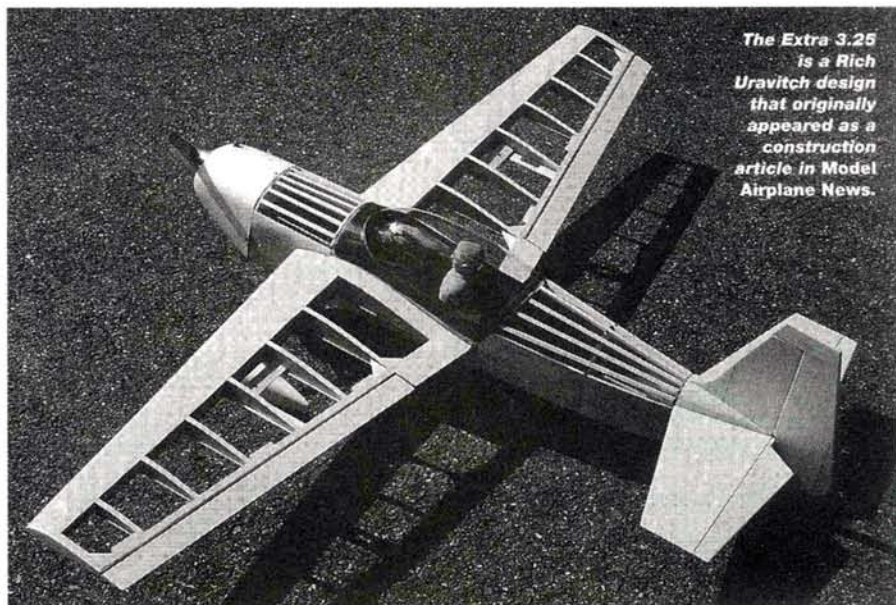
I reviewed Lanier's 1/3-scale Extra for the October '96 issue of *Model Airplane News*, and I decorated it in the 1995 color scheme used by Patty Wagstaff. I decided to do the Extra 3.25 in the same way using Insignia Blue, Missile Red and white MonoKote* and HobbyPoxy* paint. I created the vinyl graphics using a Stika cutting machine (it's distributed by Sky Aviation*).

I couldn't find a small pilot figure of Patty, so I used a Williams Bros.* male pilot figure instead; I just tell my friends that the "PW" in the registration stands for Patrick Wagstaff. The final touch was the addition of a 2-inch TruTurn* aluminum spinner.

CONCLUSION

This kit is a well-engineered winner. It's easy to build, looks great and is very aerobatic. I thoroughly enjoyed building and flying this airplane and highly recommend it for anyone who has average building experience. This is certainly not a trainer, but if you feel comfortable flying a 4-channel, aileron-equipped model, you'll have a ball with this pint-size aerobat.

*Addresses are listed alphabetically in the Index of Manufacturers on page 118.



The Extra 3.25 is a Rich Uravitch design that originally appeared as a construction article in *Model Airplane News*.

Armchair Flying

by GREG GIMLICK

1997 4TH ANNUAL HELI INTERNATIONALS

SKS VIDEO PRODUCTIONS has developed a method of documenting model aviation events that is custom-made for modelers, and in true form, they've tackled yet another major event. The Heli Internationals held at R/C Aviation Country Club is reported to be the largest helicopter event in the world and includes many of the big names, like Curtis Youngblood, Bob Johnson and Ray St. Onge. This video covers every aspect of the event and does it in almost two hours of continuous action; that means you won't be seeing what seems like hours of trophy presentations and family history of every modeler. What you will see is each pilot



highlighted and hear him give a few details about his helicopter; then you'll see him fly it. Whether you have just a passing interest in helicopters or are in the market to buy one, this format will teach you what the most popular and successful combinations are and will, no doubt, save you both time and money.

One of the things that stands out in the video is the age of the competitors. It seems that the helicopter crowd is younger than at many of the airplane events. Two brothers are featured flying their X-cell 60 Graphite helicopters in a fashion that can only be described as fantastic, especially when you find out that Taylor and Justin Chien are only 12 and 16 years old.

Before I lead you to believe that you must be under 21 to enjoy R/C helicopters, let me tell you that the older crowd was also well represented, and most of the pilots competed in several events. Some other highlights include coverage of events you may not be familiar with unless you closely follow the helicopter side of the hobby. There are speed runs, drag racing, climb competitions, day and night 3D events and certainly some outstanding scale entries. Of the scale entries, one of the best had to be Sandy Jaffe's Boeing Vertol.

Something new in SKS's format was the "What'd ya bring?" segment, which is used several times throughout the video and helps keep the interest up. They went into the pits and just asked someone, "What'd ya bring?" then filmed the participant as he described his inventory. I liked this informal interjection and thought it was great to meet some of the "regular crowd" along with the factory teams and sponsored pilots.

Overall, this is a great video—from the attention-grabbing introduction to the very last flight. The narration is clear, the pertinent details are present, the video is clear and steady, and the format is excellent. It even pulled a few heartstrings of this retired helicopter pilot as the scale Hueys, Bell 47s and Jet Rangers flew past.



R/C SOARING ... FROM THE GROUND UP!

Taylor Collins and his company, Soaring Stuff, have produced a video that's a lesson in soaring, just as the title indicates—from the ground up. The video spans about 90 minutes and takes you from opening the kit box through the assembly and to the flying field. That's quite a bold undertaking, and Taylor pulls it off without a hitch. The video isn't packed with fancy graphics and inspiring music—just lots of good camera angles and information so you can see everything as he builds a sailplane kit and explains various tips and techniques. The lesson starts with some basic building tips, such as making a disk sander, sanding blocks, notch cutters, using hobby knives and saws correctly, and tools that are handy. He then discusses the kit (Gnome 2-meter sailplane) and some alterations he likes to make. Before you know it, he has taken you through most of the construction while pointing out trouble spots and possible pitfalls along the way. Most of the video is shot from an overhead camera, with Taylor telling you what he's doing as he works, just as though you are standing in his shop. When the plane is complete, he takes you to the flying field and goes through the initial test-glide steps, being sure to demonstrate proper launching techniques and the high-start. Next on the agenda is a lesson on wind and thermals and how to stay out of trouble with them; then on to some slope information to complete the mini course.

This tape is perfect for clubs that keep a library and want to really enhance their resources for beginners—either in soaring, building, or R/C in general. If you don't live near someone who can help you learn the hobby, this is a good primer on how to get started. Taylor doesn't advocate its use to learn to fly on your own and makes the point to be sure to seek out help, if it's available, by telling you about websites and other places to get information. This is one video I wish I'd had 18 years ago when I built my first R/C sailplane and lived where there were no hobby shops or clubs to help me. ✦

One Design .40

by Rich Uravitch

A MINIMAC-Legal, 1/5-scale Aerobat

THE ONE DESIGN, or more accurately, the DR-107, is the brainchild of Dan Rihn—a West Coast aero guy who loves aerobatics. As a Pitts driver, he was familiar with the requirements for aerobatic competition and quickly recognized that in the unlimited aerobatic world, high-powered monoplanes such as the Laser, Extra, CAP and Staudacher seemed to be the only way to go ... for the well-heeled! \$200K buys an awful lot of high-tech aerobat, but it's *still* \$200K!

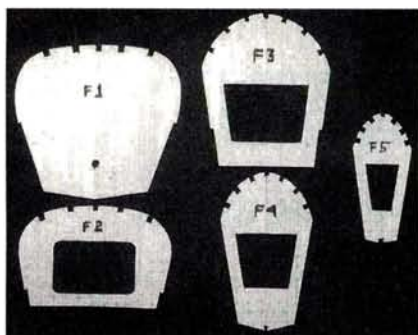
So, what to do? Easy enough! Design an aerobatic machine that would use a standard Lycoming O-320, 160hp engine, would be fabricated of conventional materials and would be easy enough to build in a home workshop. Enter the One Design.

Here I am with three of the six "beta test" prototypes. The one I'm holding is the "One Design" scheme; the blue-and-red version is a DR-107 sport-scale version patterned after a local full-size example; the third is Ted Ruffo's "personalized" version.

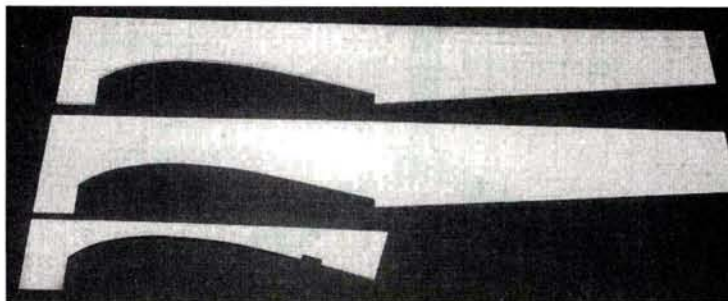


Now propose the idea of these airplanes, all painted in the same color scheme (to reduce "halo factor" in competition) to the International Aerobatics Association, and you have an aerobatic event in which the average enthusiast can compete. Well, the idea seems to be working, as over 20 of the type have been completed, and many more are under construction.

Interestingly enough, of the batch flying thus far, fewer than a handful use the specified One Design paint scheme. I guess the owner/builders feel that if they've invested the resources in building the airplane, they'll paint it in a scheme they like—



Left: stack-cut the bulkheads, join at the centerline and reinforce the joint with strips of lite-ply positioned across the width of the bulkhead. Below: the 3/32-inch balsa fuselage sides and lite-ply doubler, FD. Make sides identical.



something more "personalized" than "standardized"! Do that and your airplane becomes a "DR-107."

Bill Plunk is one of those guys who chose to personalize his DR-107; he lives not far from me in Melbourne, FL, and is currently flying the hot-rod that provided the color and markings for my third prototype model—the red-and-blue one you see here. I have to say that when I took the completed model to the airport to show Bill, he seemed as impressed with it as I was with his DR-107.

The model is true 1/5 scale and was drawn from a 3-view provided by Dan Rihn, so it's a natural for either MINIMAC or sport-



Above: all upper sheeting in place and sanded to a smooth contour. Wet sheeting to make it easier to bend it over curves. Below: balsa stringers extend from F3 to F5. Sheetting still to be added.

scale competition, for those of you so inclined; otherwise, just fly it for fun!

I have every confidence that you will be impressed with the capabilities of this small but potent aerobatic package. Those who have seen the model fly are amazed by its capabilities and responsiveness. I designed it to accept any 2- or 4-stroke engine from .40 through .70 displacement; although I fully expect some modelers to put a .60 2-stroke in the nose, it simply isn't necessary.

BUILDING SEQUENCE

The airframe will go together quickly once you've familiarized yourself with the sequence and supporting photos. Before starting actual construction, a few helpful notes might be in order. The parts template sheet shows all the fuselage bulkheads in halves. There are a number of reasons for this, but the most important is that if you stack-cut the pieces, you will always end up with symmetrical parts that make it easier to build a truer airframe. It also conserves wood and allows you to use standard-width materials and, finally, each pair of bulkhead halves is joined and then reinforced with a piece of 1/2x1/8-inch lite-ply spanning the width of the bulkhead. This adds tremendously to the strength of the finished part. I suggest you cut out all the parts first to make your

SPECIFICATIONS

Model: One Design .40

Type: sport-scale aerobatic, MINIMAC-legal

Wingspan: 47.2 in.

Length: 44 in.

Weight: 72 to 88 oz..

Wing area: 455 sq. in.

Wing loading: 22.7 oz./sq. ft. (at 72 oz.)

Airfoil: semisymmetrical

Power: .40-.50 (2C), .48 to .70 (4C)

No. of channels: 4

Recommended initial control throws (from neutral):

Aileron—3/16 in. up and down

Elevator—1/4 in. up and down

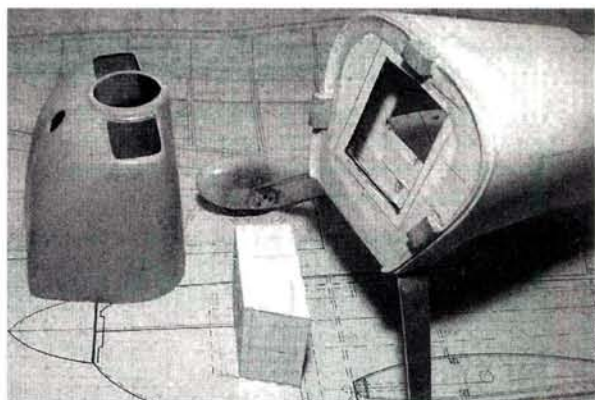
Rudder—1/2 in. left and right

Comments: this conventional, built-up balsa and lite-ply aerobat would make a great entry for MINIMAC and/or sport-scale competition.

own "kit," join the bulkhead halves and add the reinforcing strips.

WING CONSTRUCTION

1. Protect the plan from adhesives by covering it with wax paper or clear film.



Firewall detail shows cowl-mounting blocks; engine-mount "box" in foreground. Make box sides as deep as necessary to position engine correctly.

2. Pin the 1/16-inch balsa lower wing LE and center-section sheeting into place over the plan. Glue seams and joints as required.

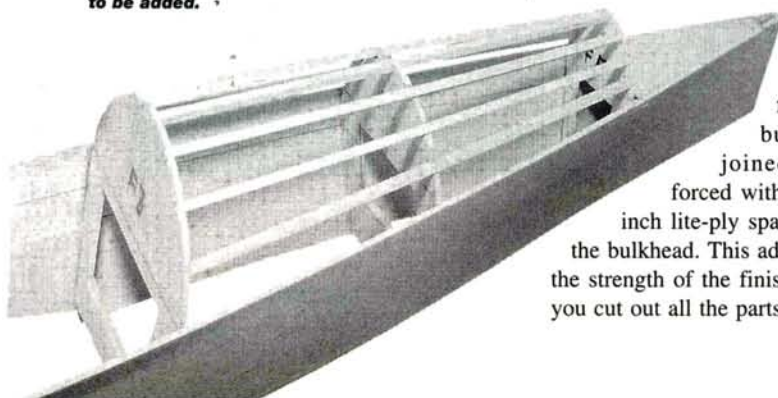
3. Pin the 1 1/2x3/8-inch TE stock into place, gluing it to the 1/16-inch balsa center-section sheeting.

4. Fit and glue 1/16x1/4-inch balsa lower capstrips into place at each rib location.

5. Using the lower spar notches in ribs W1 and W8 as guides, glue the lower 1/4x1/4-inch spruce spar into position. Remove ribs W1 and W8 for permanent installation later.

6. Fit and glue 1/16-inch balsa pushrod-exit sheeting between the capstrips of ribs W5 and W6.

7. Glue ribs W1B through W8 into posi-



FLIGHT PERFORMANCE

The One Design .40, in spite of its size, is a high-performance model. It will do nearly any maneuver in the schedule, including

tumbles and the elusive Lomcevák. Depending on the power and prop combination, as well as on wind conditions, you could probably even manage some torque rolls.

While its performance is brisk and snappy, it is in no way treacherous, nor should it be intimidating. About the only thing that's different about flying the One Design is the need to carry power on landing—nothing unusual for this type of model. It is not a floater, but it is very predictable. Once you master the technique, the model will reward you by performing some of the nicest "greaser" landings you've ever made.

If you are comfortable with a moderate performance .40-powered model, the One Design will deliver all that you ask of it—for a fraction of the price of some larger models—while offering a change from the large assortment of Lasers, Extras and CAPs.



tion, making sure that each is perpendicular to the building surface.

Note: apply glue *only* from spar to trailing edge; *do not* glue rib to lower LE sheeting at this time.

8. Laminate a W1A rib to the outside face of rib W1 to form a centerline rib sub-assembly. Precut, almost completely through the rib, the vertical slot behind the spars. This area will be removed later to accept the WJ wing joiner.

9. Install rib subassembly W1 at the position shown on the plan. Rib W1 should be perpendicular to the upper $\frac{1}{4} \times \frac{1}{4}$ -inch spar.

12. Install all the $\frac{1}{16}$ -inch balsa shear webbing between the spars from W2 through W6. The grain of the webbing is vertically oriented. Fit these webs carefully to ensure contact between the spars and the ribs; this will strengthen the wing significantly.

13. Glue the $\frac{1}{16}$ -inch balsa upper LE sheeting to the ribs and sub-LE.

14. Install $\frac{1}{8}$ -inch lite-ply gussets on the outboard side of rib W4 where it joins the TE.

15. Cut all upper $\frac{1}{16} \times \frac{1}{4}$ -inch balsa capstrips to length and glue in place.

16. Install $\frac{1}{8}$ -inch lite-ply aileron bellcrank



Soft balsa blocks are used to blend tail group to fuselage.

17. Add $\frac{3}{8} \times 1$ -inch balsa LE and wingtip blocks; sand to contour. Use a sanding block to ensure uniformity of cross-section.

18. Repeat steps 1 through 17 to build the opposite wing panel.

19. When both wing panels have been built, cut the vertical slot behind spars at W1 to accept wing joiner WJ.

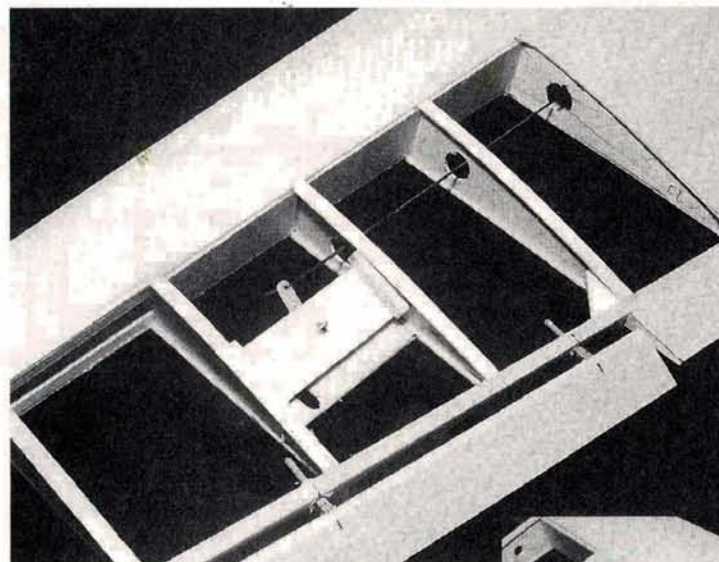
20. Install $\frac{1}{8}$ -inch lite-ply WJ joiner in one wing panel using slow-curing epoxy. Coat the W1 rib of each panel with a thin film of slow-curing epoxy and join the panels.

Note: the wing has no dihedral other than that generated by its thickness/taper. For this reason, before the epoxy has cured, invert the joined panels on the wax-paper-protected building surface and weight them sufficiently to ensure that the upper surface remains in contact with the building surface. Temporarily pin the W1 ribs together at the centerline joint to ensure proper alignment.

21. Wrap center joint with 3-inch fiberglass tape/cloth bonded with resin or Zap* CA.

22. Using epoxy, install $\frac{1}{4}$ -inch hardwood dowel through LE into slot in rib W1 sub-assembly.

23. Mark outline of aileron on TE stock. Carefully cut out and remove aileron portion.

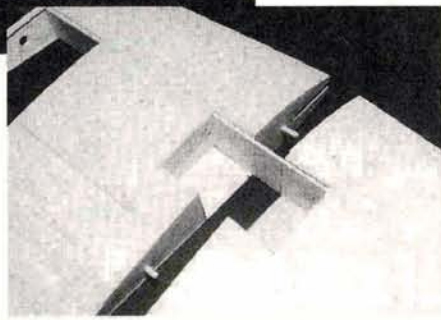


Left: left wing panel with bellcrank plate and aileron linkage installed. Add scrap blocks to fixed portion of trailing edge if Robart* hinges are used; provides more anchor surface for point of hinge. Below: wing panels being joined with part WJ. I used dowels for additional joining accuracy, but they aren't necessary if you're careful with alignment.

Important: before proceeding, pin the structure securely to the building board along the length of rib W1, and install a temporary $\frac{3}{16}$ -inch shim under rib W8 at the trailing edge. Pin the leading edge of rib W8 to the building board. This will automatically build in wing washout.

10. Add the upper $\frac{1}{4} \times \frac{1}{4}$ -inch spruce spar.

11. Glue the lower LE sheeting to the ribs from the spar forward. Glue the tapered $\frac{1}{16} \times \frac{3}{4}$ -inch balsa sub-LE to the front edges of ribs W1 through W8.



mounts between ribs W5 and W6. Fit bellcranks, wire and other aileron linkage parts at this time.

FUSELAGE CONSTRUCTION

Prepare bulkheads F1 through F5, plus the firewall, by joining at the centerline and

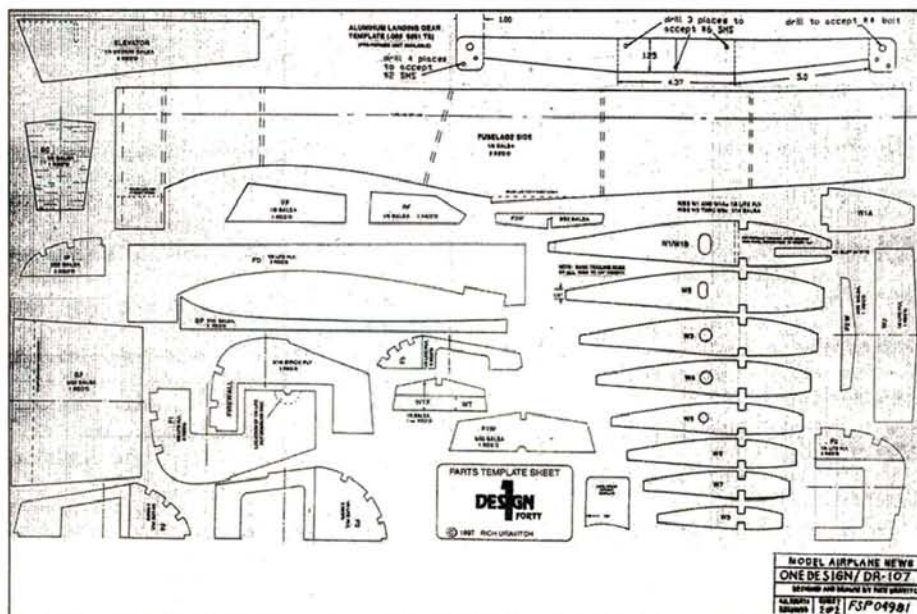
CONSTRUCTION: ONE DESIGN .40

reinforcing (F1 through F5) across the width of the bulkhead with 1/2-inch-wide strips of 1/8-inch lite-ply. The reinforcing of the firewall should be vertical, on the

join line, on the rear face of the firewall. Crosswise stiffness will result from the attachment of the engine-mount "box."

1. Prepare a left and a right fuselage side

To order the full-size plans, see page 103.



FSP04891 One Design .40

Designed by Rich Uravitch, this conventionally built all-wood design would make a great entry for MINIMAC and/or sport-scale competition.

WS: 47.2 in.; L: 44 in.; power: .40 2-stroke, .70 4-stroke; 2 sheets; LD 2. \$14.95

by laminating an 1/8-inch lite-ply doubler (FD) to the fuselage side. Use Zap CA or epoxy—not contact cement.

2. Mark the position of each bulkhead directly on the fuselage sides.

3. Mark the reference line on the inner surface of each fuselage side.

4. Glue bulkheads F1, F2 and F3 to the right-hand fuselage side, ensuring each is on the marked position and on the fuselage reference line. This is *very important!* The unique, trapezoid-shaped cross-section of the One Design demands that attention be paid here to ensure a twist-free fuselage.

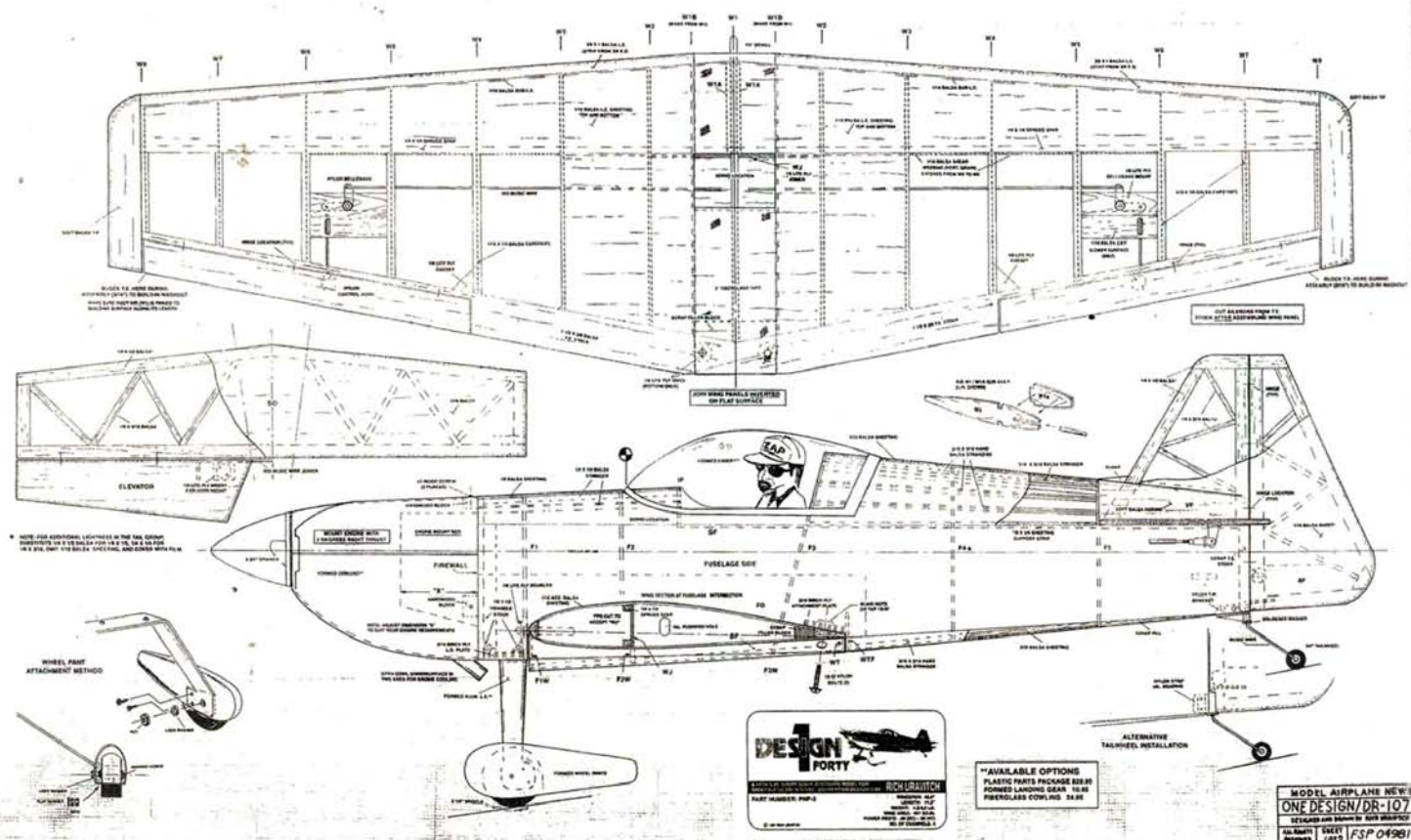
5. Add the left-hand fuselage side, but before permanently gluing, temporarily tape rear ends of the fuselage sides together so they're aligned *exactly* with each other. This will reduce the potential for building a twist into the fuselage.

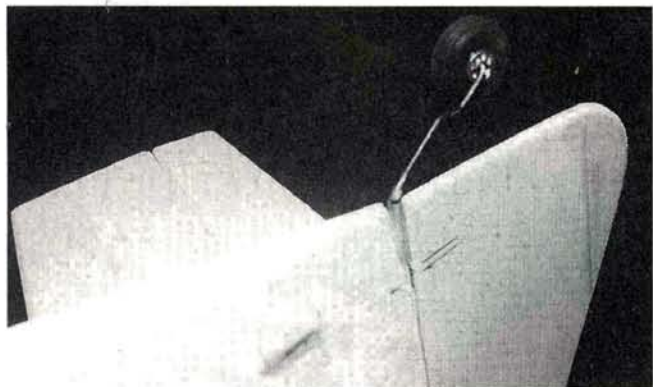
6. Add bulkheads F4 and F5.

7. After all the glue joints have dried, remove the tape and add a scrap piece of TE stock to the rear where the fuselage sides are joined. Total thickness should be 1/4 inch.

8. Add the 3/32-inch balsa stabilizer platform and cockpit floor GF between fuselage sides at locations marked on plan.

9. Add the upper bulkhead IP and 3/16-inch birch-ply firewall followed by the 1/4x1/4-





Tailwheel linkage consists of a bent wire strut running through a nylon strip aileron bearing. Attach this securely to fuselage.

inch hard balsa stringers.

10. Add the aft (turtle deck) $\frac{3}{16} \times \frac{3}{16}$ -inch stringers and the $\frac{1}{8} \times \frac{1}{4}$ -inch sheeting support strips between F3, F4 and F5.

11. Block-sand the stringered areas to provide a smooth contour to which the $\frac{3}{32}$ -inch and $\frac{1}{8}$ -inch medium/soft balsa sheeting may be attached.

12. Add all upper balsa sheeting. Wetting the outside surface will allow it to conform more easily to the shape of the formers. This will be especially necessary in the area forward of the cockpit and includes the fuselage sides in that area.

13. Sand the surfaces to blend all the joints.

14. Cutting along the line indicated on the plan, remove the sheeting from the cockpit section of the fuselage.

15. Install the $\frac{1}{2}$ -inch triangle stock supports for the landing gear plate.

16. Install the $\frac{3}{16}$ -inch birch-ply landing gear and wing hold-down plates using a liberal application of slow-curing epoxy.

17. Install the aluminum landing gear with three no. 6 sheet-metal screws.

18. Add $\frac{1}{2}$ -inch-balsa triangle-stock reinforcements to the rear side of plywood firewall.

19. Coat the interior of the fuselage from the firewall to F2 with resin for fuelproofing.

20. Add lower former WTF and $\frac{3}{16} \times \frac{3}{16}$ -inch stringer, which extends aft to bulkhead F5.



Wheel-pant installation remains fairly secure by using the formed landing gear, which has a tab to accept mounting screws.

21. Add all the $\frac{3}{32}$ -inch balsa lower sheeting and rear filler sheet, which extends from F5 to the tail.

JOINING THE WING TO THE FUSELAGE

Important: before drilling any holes, be sure to check wing/fuselage alignment and symmetry.

1. Position the wing in the fuselage cutout and

temporarily secure it with pins, tape, or clamps after aligning its centerline with that of the fuselage.

2. Drill a $\frac{1}{16}$ -inch pilot hole through the $1\frac{1}{2} \times \frac{3}{8}$ -inch TE of the wing and the $\frac{3}{16}$ -inch birch-ply attachment plate in the fuselage.

3. Remove the wing from the fuselage, re-drill the pilot holes and install the two 10-

32 blind nuts in the upper surface of the attachment plate. Alternatively, the ply mount plate may be tapped 10-32 and the threaded holes "hardened" with Zap CA. Glue two $\frac{1}{8}$ -inch lite-ply discs ("washers") into place over the holes on the bottom surface of the trailing edge.

These will prevent the bolts from crushing the surrounding balsa.

4. Attach the wing to the fuselage using two 10-32 nylon bolts.

5. Add formers F1W, F2W, F3W and WT to lower wing surface.

6. Add the center stringer, two BP parts and all the $\frac{3}{32}$ -inch balsa sheeting. Sand the wing to the fuselage joint to blend surfaces. Drill holes in lower skin to access 10-32 nylon bolts, and remove wing from fuselage.

TAIL GROUP

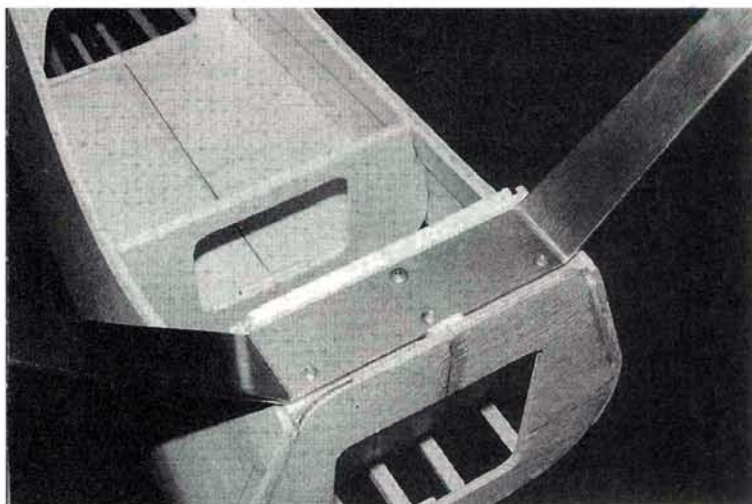
1. The vertical fin, rudder and horizontal stabilizer are all built up using $\frac{1}{8} \times \frac{1}{2}$ -inch strip

balsa, $\frac{1}{8} \times \frac{1}{8}$ -inch square balsa and parts SC, VF and RF. They are built directly over the plan after protecting it with wax paper or clear wrap. After all the framework has been assembled, $\frac{1}{16}$ -inch balsa sheeting is applied to each side of the framework.

Important: if you'd prefer to save some additional weight in the aft end of your One Design, the $\frac{1}{8} \times \frac{1}{2}$ -inch and $\frac{1}{8} \times \frac{3}{16}$ -inch may be replaced by $\frac{1}{4} \times \frac{1}{2}$ -inch and $\frac{1}{4} \times \frac{1}{4}$ -inch, and the balsa sheeting omitted. The open framework would then be covered with iron-on film covering.

2. Embed an $\frac{1}{8}$ -inch lite-ply insert in one elevator half as shown on plan. It should be installed flush with the surface to which the control horn will be attached; the "thickness gap" on the opposite side of the control surface should be filled with scrap balsa and then sanded flush.

3. Join the elevator halves with a $\frac{3}{32}$ -inch wire joiner.



Available formed-aluminum landing gear is attached to fuselage with three sheet-metal screws. Nylon bolts going into tapped holes could also be used.

4. Round all the edges of the tail group by carefully sanding to a centerline drawn around the edge of the part.

FINAL ASSEMBLY

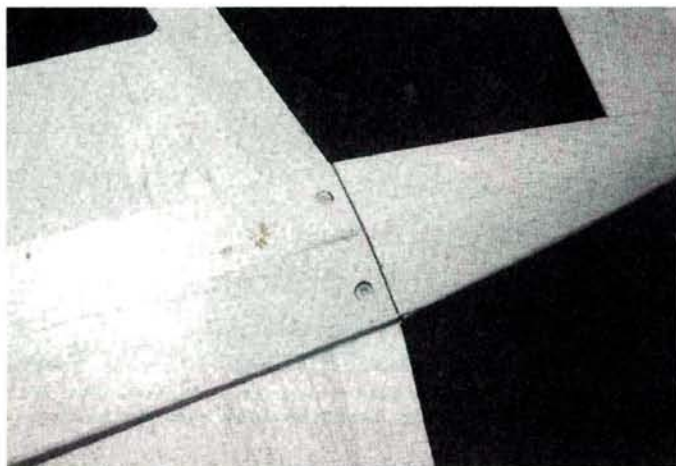
1. Temporarily attach the fin and horizontal stabilizer. Add soft balsa blocks to rear of F5 to form fairings between vertical fin and stabilizer. Carve and sand to final shape. Remove fin and stabilizer until after they have been covered.

2. Make up a tailwheel-strut assembly using a nylon bracket as shown, or by inserting a length of $\frac{3}{32}$ -inch music wire into a nylon aileron bearing, bending the wire to form the strut and cutting a slot in the aft end of the fuselage to accept the bearing. Remove assembly until the covering has been completed.

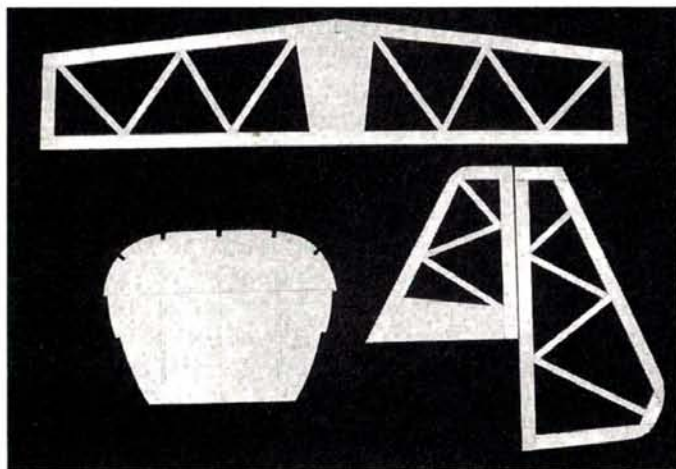
ENGINE INSTALLATION

The firewall is sufficiently far aft to allow the model to accept an engine of nearly any size and configuration. Firewall-to-engine drive-washer spacing is determined by the length of the sub-mount (box) you make for your engine installation. My prototype model is powered by an Enya .61 4C and the other, by a Saito .56 4C. They both pull the One Design around briskly and quietly.

The ability to swing a large prop offers an advantage in vertical maneuvers, especially on the down line, by keeping the speed relatively constant. Bolt the engine mount to the box using 4-40 hardware, and attach your engine of choice to the mount. Trim the vacuum-formed cowl to suit your installation. The rear of the cowl can be trimmed slightly to accommodate any minor dimension differences. The three hardwood cowl-attachment blocks should now be added to the firewall. Recess them about $\frac{1}{16}$ inch from the edge of the fuselage to allow for cowl thickness. *Note:* the cowl butts up to the fuselage; it does *not* go over it.



Above: wing attached and under-wing sheeting in place. Nice and neat; no protruding screws. **Below:** stabilizer, fin and rudder are simple stick-frame structures; they can be sheeted with $\frac{1}{16}$ -inch balsa or frame material "up-sized" and then covered with your favorite film. Saves a little weight in the tail.



The prototype 1D .40 all ready for covering.

FINAL PREPARATION

In preparation for covering, go over the entire airframe, filling any dings or imperfections with HobbyLite, MicroFill or a similar putty. Final-sand all the wood surfaces to ensure a high-quality covering job. Temporarily install all the control linkages and radio equipment, as well as the hinges and any other accessories.

Once satisfied with all the installations, cover your One Design with your favorite material. The prototypes were finished with

Ultracote*, MonoKote* and Oracover*; they all yielded fine results. When the covering is complete, add the pilot figure ($\frac{1}{8}$ scale), canopy and any other details you might choose.

The all-up dry weight of your One Design should be between 72 and 88 ounces. Balance your model in pitch at the location shown on the plan. This CG location is very conservative, and you will likely want to move it aft as you gain flying experience. Feel free to do so; up to $\frac{1}{2}$ inch rearward is still acceptable. The feel will be decidedly "snappier" in pitch, but not unmanageable for the experienced flyer. After checking the CG, check the balance in roll also. The model should show no tendency to drop a wing; if it does, add the necessary weight to the light wingtip.

RADIO INSTALLATION

Nothing terribly complicated here. Use either solid spruce pushrods or Nyrod to the elevator and rudder. If you use Nyrod, make certain the conduit tube is anchored securely to the structure. I positioned the battery pack aft of the servos, against bulkhead F-3, to provide the CG that I wanted.

One note on radios: I equipped my One Design with a "plain vanilla" JR* F400 4-channel system—no bells, whistles, dual rates, exponential, or coupling; just four trimmable channels. Did I like it? Well, in my haste to test-fly, I took off with the antenna coiled up as supplied "out of the box." I took that flight, plus one more, before I discovered the condition. The radio never skipped a beat and successfully endured the ultimate "range check," and I've still got an airplane! You'll notice in the flight shots that the antenna now trails happily below and behind the model! Good radio? You bet! Just goes to show that you don't need to spend megabucks to be sure of good performance.

A plastic package for the One Design is available directly from me. It consists of a clear canopy, plastic cowl and wheel pants, and an instruction sheet (\$29.95). I also have pre-formed aluminum landing gear (\$13.95) and a fiberglass replacement cowl (\$27.95). Postage is included in these prices. Orders directly from Rich Uravitch, 1094 Glendale Ave. NW, Palm Bay, FL 32907; phone/fax (407) 728-0486; email: AEROSCALE@aol.com.

*Addresses are listed alphabetically in the Index of Manufacturers on page 118.

SR Giant Scale!

If you're into Giant Scale aircraft, we've just introduced some new battery packs specifically for you!

Our new **1600 Series** pack replaces our 1500 Series pack that so many of you have chosen as the standard for Giant Scale aircraft. In addition, we've also updated our 1800 Series pack replacing it with our new **2000 Series** pack.



The exciting thing about these two packs is that they will give you much more flying time than a 1200mah pack yet they are no larger or heavier! Both the **1600 Series** and **2000 Series** packs weigh 7.4^{oz} and in a flat pack measures only 3.5" x 1.7" x .9".

If what you really want is a 1200mah pack, no problem! We're also introducing our new **1200 Series** pack that only weighs 5.4^{oz} and in a flat pack measures only 3.5" x 1.4" x .9"! As you can see, it's much smaller and lighter yet it still gives you all the power you'll need for large aircraft with lots of servos.



In addition to our new packs, we've also added **Volume R-7** to the **R/C Techniques** library. Volume R-7 will tell you everything you ever wanted to know about the wiring of large scale aircraft. If you're not familiar with *R/C*

Techniques, it's a bi-monthly publication we publish covering all phases of our R/C Hobby. We maintain a complete library of back

issues so that you can catch up on anything you've missed. Here are the specific questions answered in **Volume R-7**:

- ◆ Why would you need a higher capacity battery pack?
- ◆ Why wouldn't you need a higher capacity battery pack?
- ◆ What size range is generally the best to use?
- ◆ Other than capacity, why else wouldn't you want to use a standard size battery pack on a Giant Scale aircraft?
- ◆ What does the internal impedance of the pack have to do with your pack choice?
- ◆ How low a voltage is too low?
- ◆ What charge rate should you use?
- ◆ Can you extend the charge time to make up for a charger that doesn't charge at a high enough rate?
- ◆ Why shouldn't you use a "peak detection" charger?
- ◆ Should you use a 4 or 5 cell pack?
- ◆ Why would you want to use a 5 cell pack?
- ◆ Why wouldn't you want to use a 5 cell pack?
- ◆ Why don't 5 cell packs give you more flying time?
- ◆ What wire size should you use?
- ◆ How should you extend the leads on a battery pack?
- ◆ What size wire should be used for servos?
- ◆ Which is more important, the battery pack lead or the servo leads? Why?
- ◆ Should you ever use an aileron extension to extend a battery pack lead?
- ◆ Is there a better type of system switch?
- ◆ Why should you only use "slide" switches?
- ◆ How can you use double switches?
- ◆ What cycler and ESV loads should be used on larger packs?



- ◆ Which battery backup systems are best?
- ◆ Do you really need one?
- ◆ How can I power the receiver from one pack and the servos from a second battery pack?
- ◆ What receiver modifications are necessary?
- ◆ What size pack should be used to power the receiver?
- ◆ What size pack should be used to power the servos?
- ◆ How shouldn't you power accessory items such as smoke pumps and ignition systems?

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KYOSHO Nexus

by HENRY KORCZAK

THE NEXUS is Kyosho's* newest entry in the .30-size helicopter market. It's a low-cost heli for those who want to try their hand at the challenges of helicopter flight. The Nexus follows in the footsteps of the Concept 30—the machine that I learned on. It took me from learning how to hover, to forward flight and basic aerobatics. It was a faithful companion and always ready to please. It was easy to fly, easy to maintain and could take a lot of abuse. The Nexus has the same attributes.

THE KIT

This new heli has some major improvements; first is the main rotor head, which has fewer parts and now uses a solid, one-piece axle instead of the dual flapping head used on the Concept. This helps to reduce the chance of boom strikes. The second change is in the engine area. Instead of being mounted inverted (Concept 30-style), the engine is mounted with its crankshaft pointing up and canted 15 degrees forward of the main shaft. This eliminates the problems associated with inverted engine installations and makes the starter cone easy to reach. The engine can also be removed in just a few minutes by removing the throttle linkage, fuel and pressure lines and removing the four



PHOTOS BY WALTER SODAS

U.S. ARMY AIR CORPS COLORS AND MARKINGS

*A brief history of design
changes through 1947*

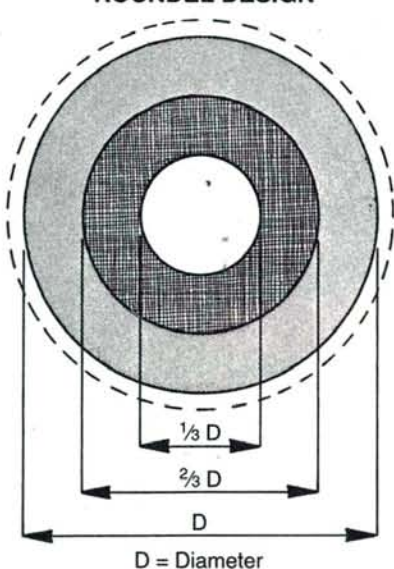
Text and illustrations by JIM NEWMAN

U.S. ARMY PAINT SCHEMES

Paint schemes and markings on military aircraft varied considerably as the years passed, often seemingly without any real logic behind the changes. This has led the writer to wonder if markings and camouflage are similar to fashion—subject to the whims of those in power at the time. However, it is known that, on both sides of the Atlantic, departments exist wherein a team of color specialists concocts mixes of paint that supposedly render aircraft difficult to see or, when applied in carefully “designed” patterns and combinations, distort the outline sufficiently to make the observer wonder if he really saw what he thought he saw! Yes, camouflage does work, as long as the aircraft to which it is applied remains over the background for which the scheme was designed, and this hardly ever happens.

The following notes offer some guidance as to the changes in colors and markings as the years progressed. Be advised that when building a scale model, one should work according to some kind of specific documentation, i.e., photographs, drawings and descriptions of the type of aircraft being modeled, because there were always some deviations or exceptions to the schemes mentioned.

JANUARY 1918 TO AUGUST 1918 ROUNDEL DESIGN



• **Pre-1918.** Aircraft supplied to the U.S. Army Air Corps by U.S. manufacturers prior to WW I were generally devoid of any paint scheme. They generally had just a clear-doped-linen finish. Because the raw, un-doped fabric was a very pale oatmeal color, the clear-doped fabric took on a translucent, grayish-cream look and, in model fabrics, the Antique Super Coverite very closely approximates this.

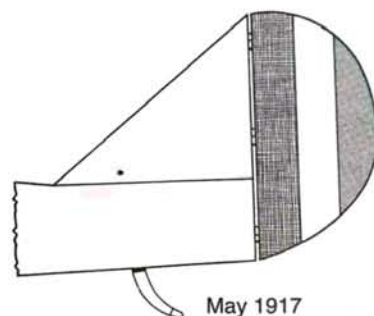
Exceptions: aircraft supplied by foreign sources retained the factory paint scheme applied. The British deHavilland 4 retained its dark green top, sides and fin (including the fuselage underside). Wings and stabilizer had clear-doped undersides. The French Nieuport was all silver. SPAD fighters had tan and dark green camouflage sides and upper surfaces with clear-doped undersides.



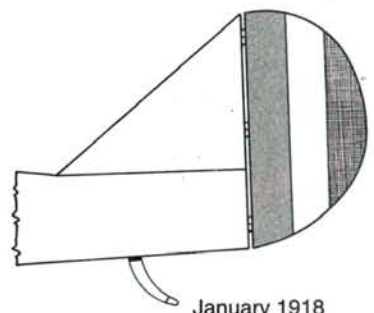
Under-wing lettering for most trainers was 24 inches tall. Though the above photo clearly shows the angled corners of the letters, there were times when the lettering was rounded by manufacturers.

• **1918.** The Army Air Corps standardized the color scheme. Until 1927, the order was olive drab upper surfaces. The vertical surfaces and fuselage undersides had clear-doped finishes, although sometimes, the fuselage sides were given a protective

EARLY RUDDER DETAIL

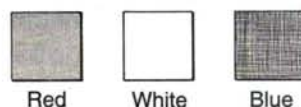


May 1917



January 1918

Color Key



mount bolts. The engine will simply fall out. There are fewer parts in the kit, and this helped Kyosho keep the price down. The included muffler designed for the Nexus is a nice feature; its exhaust outlet can be pointed in any direction (instead of just downward). Other features include: autorotation, ball bearings (18 in all), a rotor-head button, 2mm tail-drive wire and tail boom supports.

ASSEMBLY

Two instruction manuals come with the kit. The main manual consists of the more common exploded view of all the sub-assemblies. A neat feature of this manual is that in every step that requires a screw, nut, bolt, pushrod, etc., the fastener is shown full size. This eliminates a lot of confusion about which screw to use, and where. The other manual supplements and clarifies the steps listed in the main manual.

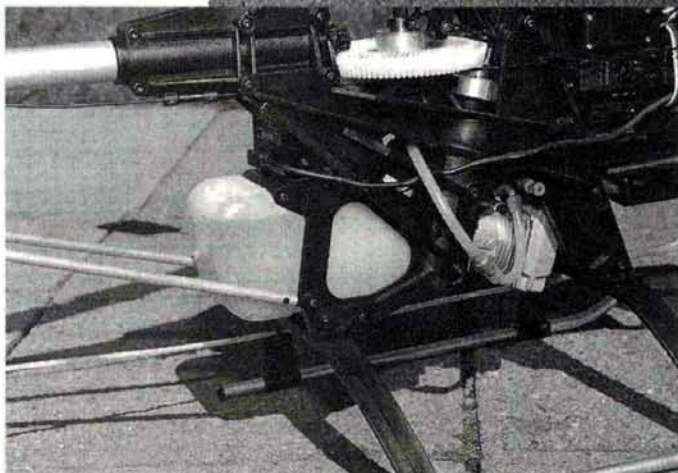
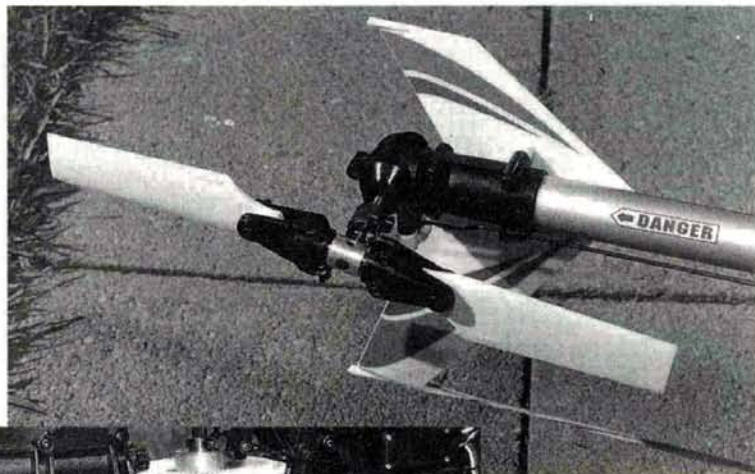
Because the Nexus is so easy to assemble, I'm not going to give a blow-by-blow



Shown here are the swashplate and main rotor head. The rotor head has fewer parts and a one-piece axle instead of the dual flapping head used on the Concept heli.

description of each step. Instead, I will highlight the areas that need care or special attention. Let's start with some things to keep in mind during assembly. Use a thread-lock compound on all metal-to-metal fasteners to prevent them from loosening because of vibration. Also, the majority of the assemblies are held together with self-tapping screws in plastic parts, so it's important not to overtighten the screws and strip out the plastic; snug is perfect. Don't use thread-lock on screws that go into plastic; over time, it will

The tail rotor and rotor drive are standard designs. The Nexus uses a 2mm drive wire to power the tail rotor. The larger than normal drive wire reduces the possibility of "wind up" when power is applied.



Another change is in the engine layout. Instead of the crankshaft pointing straight up, the Nexus has its engine tilted 15 degrees forward. This eliminates inverted engine problems and makes it easier to start.

dissolve the plastic. For peace of mind, use a drop of thick CA on the screw instead.

Moving right along, we start with Step 1: the start shaft and clutch bell. I secured the bearings' inner races to the shaft using a little thread-lock. This will prevent them from spinning on the shaft and wearing it out prematurely. Step 2: on the tail-drive shaft, I again secured the bearings with thread-lock, using a side frame to space them correctly. In Step 4, the plastic bushings on the lever assembly were too tight,

and this prevented the lever from pivoting freely; a chamfer on the bushings took care of the problem. (I also oiled them.) In Step 5, be certain to use thread-lock on the screws that secure the autorotation hub to the main gear. Step 7: I slightly enlarged the holes in the bellcrank so it could pivot freely on the retaining pin. Step 12: use care to align the start shaft and engine/clutch assembly, then slip a piece of paper between the pinion and main gear to adjust the gear mesh. When it's adjusted

SPECIFICATIONS

Model Name: Nexus 30

Type: helicopter (collective pitch)

Manufacturer: Kyosho

Distributor: Great Planes Model Distributors

Rotor span: 47.2 in. (1,200mm)

Length: 41.3 in. (1,050mm)

Weight: 6.17 lb. (2,800g)

Gear ratio: 9.8:1:5 (engine:main:tail)

Engine req'd: .30-size heli engine

Engine used: O.S. .32SXH

Radio req'd: 5-channel heli radio (aileron, elevator, throttle, rudder and collective)

Radio used: Futaba® 6XH with 5 S-148 servos

Gyro used: Futaba G153

Prices: \$399.99 (standard kit), \$599.99 (assembled with engine).

Features: low cost; easy to build; great instruction manuals; good technical support; sleek styling; very stable hovering platform; easy to maintain; easier engine removal; one-piece canopy.

Comments: the Kyosho Nexus is a fine way for a beginner to explore helicopter flight. Its stability helps with learning to hover and fly forward. It's easy to build quickly and correctly, and the manuals answer any questions that may arise. Technical support is just a phone call away.

Hits

- Low cost.
- Quick and easy to build.
- Comprehensive manuals.
- Great looks.
- Very stable in hover.
- Easy to maintain.

Misses

- Slight blade tracking problem during aerobatics.

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KYOSHO NEXUS

FLIGHT PERFORMANCE

The O.S.* .32SXH was first broken in on a test stand; this allowed the high- and low-end needle settings to be dialed in. The first flight was during a dead calm evening—perfect for trimming. The first liftoff was uneventful; the trims were almost perfect, and only a few

clicks of cyclic and a few of tail rotor were needed. The tracking was right on, with no adjustments needed. The head speed was a little on the low side, so both blades were reduced in hovering pitch. The trim positions on the transmitter were noted, and the appropriate pushrods were adjusted so the trims could be re-centered. All of this was easily done on the first tank of fuel.

After the adjustments had been made, the Nexus would hover hands off—quite an

accomplishment for a new heli. To break in the gears and other moving parts, I continued to hover the Nexus for a few tanks. Then it was time to drop the nose, add power and move into forward flight. The Nexus responded well and cruised around easily. Forward flight was

very solid with no pitching tendencies. I tried some aerobatics and found that the recommended setup was for a more relaxed flying style. One thing I noticed was that the main blades would not hold their tracking through maneuvers—most likely because the dampers are very soft—but this shouldn't cause any problems. I tried a few autorotations and found the blades to be marginal, especially in no-wind conditions.



properly, there should be a slight clicking between the gears. Step 15: I pointed the muffler outlet away from the chassis (instead of pointing it downward) to help

prevent dirt and dust from blowing up into the heli. Step 19: before securing the flybar in the rotor head, be sure to center it. Step 20: before putting the flybar paddles on, I put an 1/8-inch wheel collar on each side of the flybar to fine-tune the bal-

ance. The rest of the helicopter was assembled with no problems.

RADIO INSTALLATION

Installation of the Nexus' radio is very straightforward. All pushrods are shown full size in each step in the manual. Attach the servos using the kit-supplied screws; do not use the brass eyelets that come with the radio. Kyosho has taken great pains to show the correct servo horn placement for each control—a big help for someone who has never before set up a helicopter. This will at least allow beginners some chance of success, if they go at it alone.

ROTOR BLADES

The blades that come in the kit are weighted and pre-covered. If the covering

is loose, it can be re-shrunk by using a steaming teapot. The blade root covers need to be epoxied to the blades. I removed them where they are attached to

the blades and used 30-minute epoxy and clamps to bond them into place. Be sure the Kyosho logo is on the top blade cover, as there is a top cover and a bottom cover. After the epoxy cured, I balanced the blades by tee-

tering them on a pivot between two glasses. I added some tracking tape to the light blade so both of them were level. All that remained to do was to trim the one-piece canopy and apply the decals, and the Nexus was ready for flight.

SUMMARY

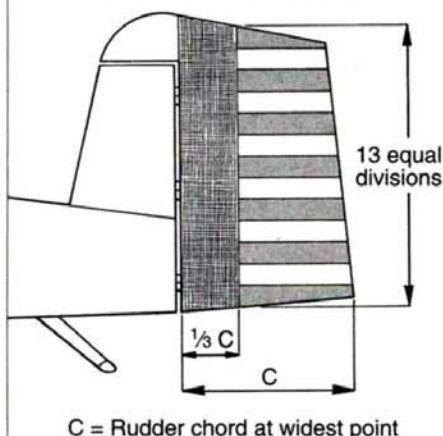
The Nexus is very easy to build; it took me about six hours from start to finish. If you're a beginner, it might take a little longer—but not much. If you do have any problems, the Kyosho Helicopter Hot Line is available to assist you, and replacement parts are readily available. The Nexus is a great first helicopter that can become a faithful companion.

*Addresses are listed alphabetically in the Index of Manufacturers on page 118.

coat of pale cream. The bottoms of wings and horizontal stabilizers were clear-doped.

The olive drab, or "OD" as it became commonly known, of that era was vastly different from the OD of today and of that offered by current model-covering materials that are more of a brown shade. The early OD had a definite greenish look to it and closely matched the Olive Drab FS 34087 published in the Federal Standard (FS) 595 dated March 1, 1956; if you have a copy with that date on it, you

Late 1926 Rudder Detail

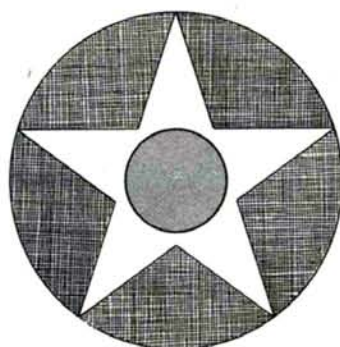


had better keep it under lock and key, because it's priceless. Examination of good photos of that time produced from glass-plate negatives show the paints to be anything from matte to semi-matte.

• **1927.** The military developed concerns over air-to-air collisions. The army specified that wings, horizontal tails, fins and rudders must be finished in Chrome Yellow FS 3358—a semi-matte color close to Cub Yellow or FS 33538. Struts and landing gear were also finished in OD.

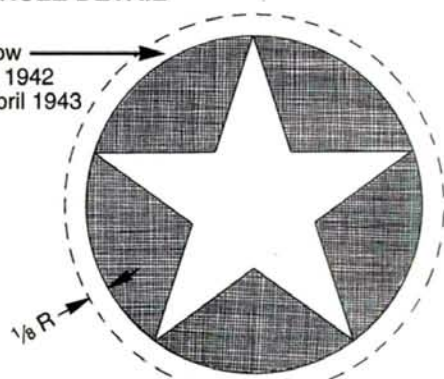
• **1928.** The army took delivery of its first all-metal aircraft—the Ford Trimotor—

STAR IN CIRCLE DETAIL



May 19, 1917

Yellow
May 1942
to April 1943



Late May 1942

and specified that all transport aircraft were to be delivered in natural metal. But in 1935, the Northrop Co. delivered a painted A-17 aircraft, and they remained painted until 1936.

• **1936.** The army specified a gloss Light Blue FS 15102 (ANA 501) for all fuselages except the metal-skinned machines, which were to be supplied in natural metal. The new metal-skinned Northrop A-17A was an exception and was painted gloss Light Blue. The natural-metal finish on other metal-skinned machines was retained until 1941. Other exceptions were: Ryan PT-16,

-20, -21, -22 with natural-metal fuselage, chrome yellow wing, stabilizer and fin.

• **1940.** Many obsolescent combat aircraft were relegated to training duties and were required to be painted silver overall or to remain in natural metal with silver-painted fabric surfaces. New aircraft were to be delivered in OD with the undersides in Neutral Gray FS 36173. (The Twin Beech C-45 was the only transport aircraft remaining in blue and yellow, but it eventually changed schemes, with many special-purpose schemes as WW II escalated.)



Above: at the Ryan Aeronautical Co. plant in San Diego, CA, a huge number of Ryan PT-21 army trainers and NR-1 Navy trainers await shipment to training units throughout the country. Circa 1936, natural-metal fuselage, chrome yellow wings, stab and fin. Rudder has blue leading edge with 13 red and white horizontal stripes.



Left: the Northrop A-17 carries the Army-specified gloss blue fuselage that was retained until 1941. Note the early white-star-in-blue-circle insignia with red center markings.

U.S. ARMY AIR CORPS COLORS AND MARKINGS

• **1941.** The night-fighter scheme was adopted for the converted Douglas A-20. It was matte black overall. Later, the P-61 and the F-82 were painted gloss black overall. The B-29 remained in natural metal and was used at night; its underside was painted gloss black with a wavy demarcation line along the fuselage side.

• **Early 1942.** The blue-and-yellow scheme was deleted from all training aircraft, and silver overall was made standard for these types; although many did survive the War still in their blue and yellow.

• **May 1942.** For air operations in North Africa, OD was replaced by Desert Sand FS 30279, which is seen on P-40s and some B-24s. The neutral gray undersides were replaced by Azure Blue FS 35231.

Planes delivered from Britain did not follow these color schemes. They were operated in their original Dark Earth FS 30118 and Dark Green FS 34079 RAF camouflage; British markings were painted



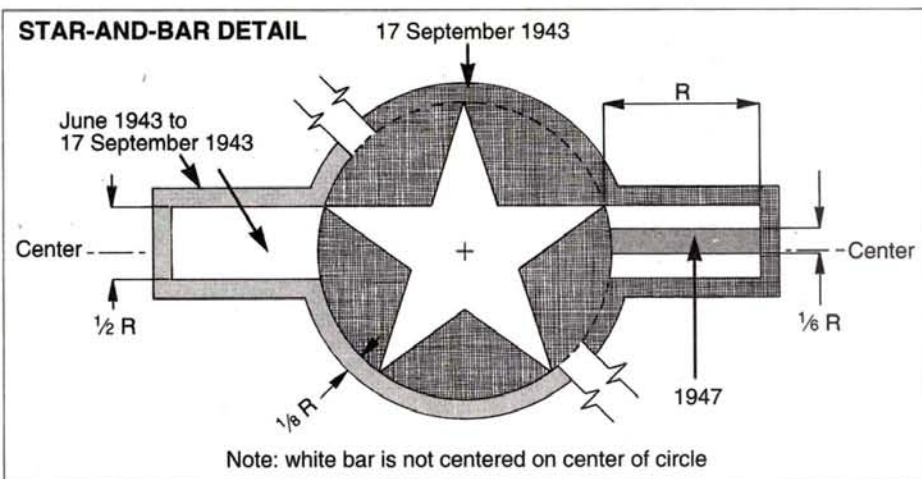
Here, an all olive drab P-40 wears the star-and-blue-circle insignia with red center painted over. The nose and tail numbers were probably yellow. In May 1942, for air operations in North Africa, olive drab finishes were replaced with Desert Sand FS 30279. The neutral gray underside was also replaced with Azure Blue FS 35231.

over with a circle and star. RAF code letters and serial numbers were often retained. Some British aircraft, e.g., the Hurricane and the Spitfire, were delivered in RAF desert camouflage of Dark Earth FS 30118 and Middle Stone FS 30266 with the Azure Blue undersides.

• **1944.** Camouflage was deleted, except for on liaison types (L-4, L-5, etc.), helicopters and night fighters.

THE MARKINGS PROGRESSION

• **May 19, 1917.** U.S. Army Air Corps adopted the star in a blue circle with a red dot in the center. This was applied inboard of the ailerons and ran the full chord of the upper surface of the top wing and the lower surface of the bottom wing. Three stripes of equal width were on the rudder—blue at the leading edge, white in the center and



red at the trailing edge. Note: the blue was considerably lighter than the Insignia Blue of 1941 and varied considerably in shade owing to non-standardization.

• **January 1918 to August 1919.** USAAC adopted the red, white and blue roundels, especially on the war front in Europe. Within the U.S., many aircraft retained the star, but some carried a mixture of the two

applied to each side of the fuselage—top of left wing and underside of right wing. Un-camouflaged aircraft retained stars on the top and bottom of both wings.

A curious reason was given for the asymmetric application of the wing stars. It was feared that enemy pilots would use them as ranging marks based on the distance between the stars. Having been involved with gun-sight trials, the idea of using national insignia for ranging caused me no end of mirth, because most gun sights were calibrated in terms of the target aircraft wingspans, not the distance between crosses or "meatballs," which could vary! It was obviously some high-ranking officer's muddled thinking that was caused by combat fatigue and aggravated by too many hours flying a heavily armed desk.

• **Early 1942.** Red-and-white tail stripes were deleted from all aircraft.

• **End of May 1942.** Red dot deleted from the center of the star.

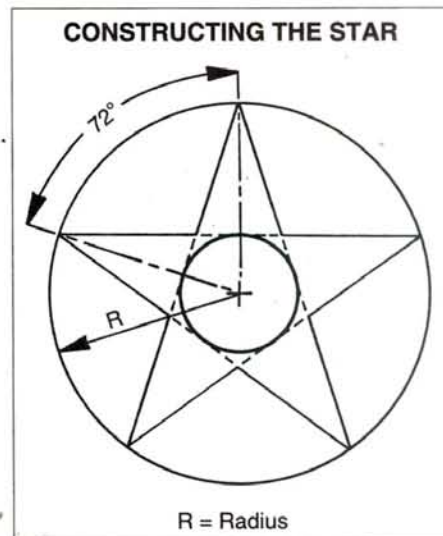
• **Until June 1942.** Aircraft that were not camouflaged continued to carry stars on both wings.

markings well into 1919. This was primarily caused by repairs and the swapping of components between aircraft. It was not unusual to see one aircraft carrying roundels and stars—even on opposite wings! The order of the vertical rudder stripes reversed, with red now at the leading edge and blue at the trailing edge.

• **After 1919.** Aircraft returned to the star in a circle.

• **Late 1926.** A pattern of 13 alternating red and white rudder stripes was adopted, along with a single blue vertical rudder stripe.

• **End of February 1941.** There was a major change to the national insignia. The red-and-white tail stripes were deleted from the rudder of combat aircraft. A white star on an Insignia Blue FS 35044 disk was



- **May 1942 to April 1943.** Some aircraft operating out of England and in North Africa carried a 2-inch-wide circle of Yellow FS 3358 surrounding the dark blue background of the star.

- **Early 1943.** Asymmetric application of wing stars was adopted for all types of aircraft.

- **June 1943 to 17 September 1943.** A white bar was added to each side of the dark blue disk, and the whole insignia was outlined in Insignia Red FS 30109 (the same dull red that had been adopted for the center of the RAF insignia).

The white bar was not centered in the circle but was aligned with the upper edge of the horizontal points of the star.

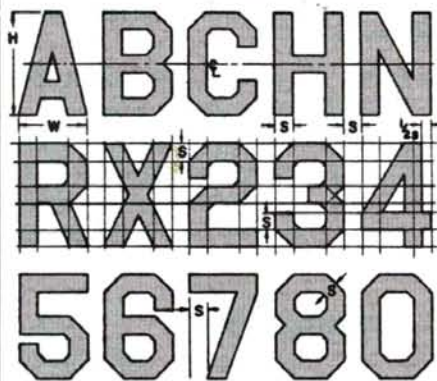
- **17 September 1943.** The red outline was painted over with the Insignia Blue FS 35044.

- **1947.** A Red FS 31136 bar was added to each white bar.

LETTERING

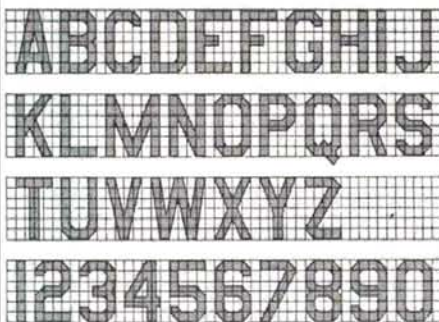
- **1927 to end of May 1942.** "U.S. ARMY" was written in large letters across the underside of the bottom wings

BLOCK LETTER STYLE



Layout of standard block letters 3:2 height/width ratio 45° corners

OFFICIAL LETTERING STYLES



(From USAF Manual T.O. 1-1-4 Exterior Finished Insignia & Markings Applicable to USAF Aircraft)

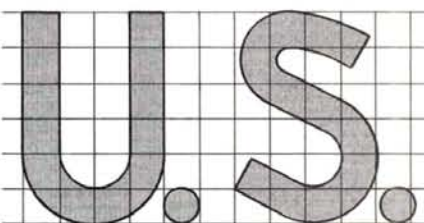
Width of letters = $\frac{2}{3}$ height
M & W width = height
Stroke thickness = $\frac{1}{6}$ height
Space between letters = $\frac{1}{6}$ height
Space between words = $\frac{2}{3}$ height

on biplanes and across the underside of monoplane wings (see illustration for proportions). On most trainers, letters were 24 inches tall; black letters on gray, silver or yellow. Many aircraft still carried this lettering until well after 1942. Although the illustration shows letters with angled corners, some manufacturers applied letters with rounded corners, so check your reference photos!

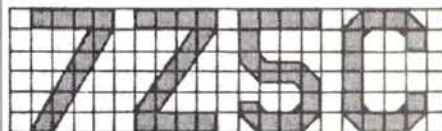


A rare Republic TP-47G Thunderbolt (two-place trainer version) is dressed with the blue-and-white star-and-bars insignia. The overall finish is olive drab with a neutral gray underside.

Technical data was carried on a panel that was low on the fuselage's left side; depending on the type of aircraft, it was below or forward of the cockpit. Lettering



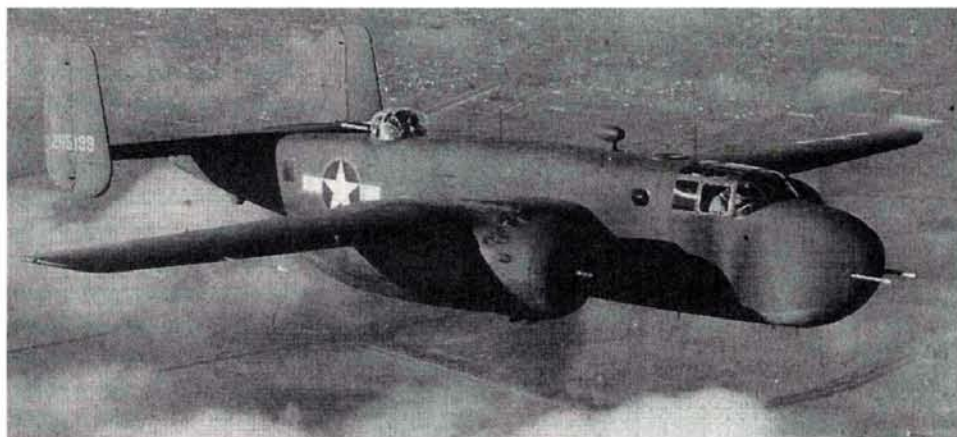
Example of rounded letters applied by some manufacturers



Often seen variations from the official specifications.

In these variations, the letter C with the extended ends, the 7 and Z, without the 45° corners, are more pleasant to view than the official style! Check your documentation.

described aircraft type, serial number, fuel and oil requirements, etc., and was, at most, 1 inch tall. Letters were black, white,



Here, a B-25 Mitchell bomber displays the typical star-and-bars U.S. insignia with red painted around the insignia.



An all-silver Aeronca L-16A with thin red stripes added to the white bars of the U.S. insignia—circa 1947.

or yellow on blue, or they were black, white, or yellow on OD.

The above material is from a variety of sources so, again, the author urges builders to check aircraft being modeled against reliable references such as photographs. ✦

by RICHARD
LA PORTE

Hog Bashing

*Or, how to turn a Sig Hog Biplane
into a Pitts Special*

LAST SUMMER, my friend Earl Nichols let me fly his Sig* Hog Biplane. It flew rock steady and did everything smoothly and gracefully; unlike most other biplanes I had flown, the Hog Biplane didn't seem to have any bad habits.

As I flew Earl's biplane, I remembered the article on the history of the full-size Pitts Special biplane written by Budd Davisson that appeared in the May '96 issue of *Model Airplane News*. I could not forget the stubby but classic lines of the Pitts shown in Budd's article. His description of the aircraft's capabilities made it sound really exciting. Slowly, the gears in my head started to turn, and the similarities between the Hog and the Pitts started to become clear. Just maybe, I thought, it might be possible to kit bash the Sig Hog into a model that would kinda look like a Pitts without losing any of the Hog's good flying characteristics.

Winters are long in Maine, and I couldn't think of a better way to make use of the time. I bought the Hog Biplane kit and took a close look at the plans. I then compared them to the photos in Budd's article and to other photos of the Pitts Special I had collected. The only scale concession I would have to make would be to keep the top wing straight instead of making it swept back as it is on the full-size Pitts. The model flew so well as it

The Sig Hog Biplane is an honest, good performing model with few bad habits. It is also the main ingredient for this kit-bashing project.



PHOTO BY BUDD DAVISSON

The motivation behind the project was Budd Davisson's article on the full-size Pitts Special biplane.

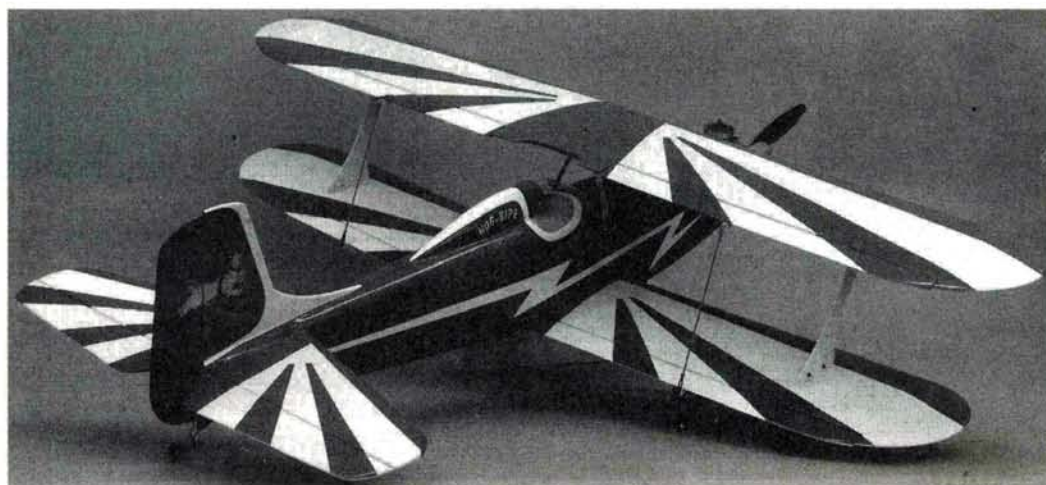
was that I did not want to modify it. But I did apply a trim that gave it the illusion of a swept top wing.

The fuselage was a different matter. In its stock form, the kit provides a rather slender, long fuselage that is built around a box structure; it needed to be modified considerably. Here's what has to be done to turn the Hog into a Pitts.

MODIFICATIONS

To shorten the rather long Hog Biplane fuselage, the firewall has to be moved back about 2 inches. This is essential to achieve that stubby "Pitts" appearance. Be careful not to change the amount of downthrust called for on the plans.

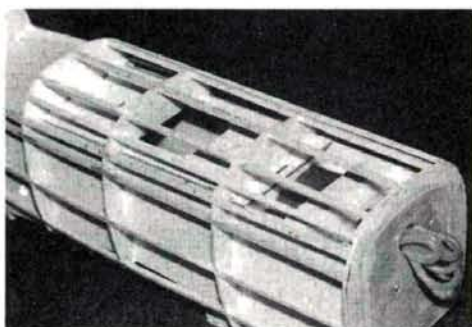
Next, the cockpit must be moved back about 2 inches so that the distance from the cockpit bulkhead to the vertical fin will look more scale. The fuselage also has to be fattened up somewhat by adding false formers and stringers applied over the stock fuselage structure. The plastic Hog Biplane headrest obviously has to go, and the turtle deck aft of the cockpit must be raised. This is done with stringers and formers and



PHOTOS BY RICHARD LA PORTE

is covered with 1/32-inch plywood. The area between the firewall and the cockpit was also sheeted with plywood. The shapes of the rudder, fin, horizontal stab and elevator have to be changed, as the rounded shape of the tail feathers is a major part of the Pitts' personality. I used laminated 1/16-inch balsa strips to add the curved leading edge to the stab. The vertical fin and stab have to be installed prior to the addition of the turtle-deck sheeting.

To add a gentle curve to the fuselage bottom, I glued a spline to it and boxed in the underside of the lower wing with a broad, V-shaped fillet made of 1/64-inch plywood. The spline is made of two pieces of 1/4-inch balsa with a piece of 1/32-inch plywood laminated between them. The spline continues all the way to the tail post and is centered on the fuselage bottom sheeting.

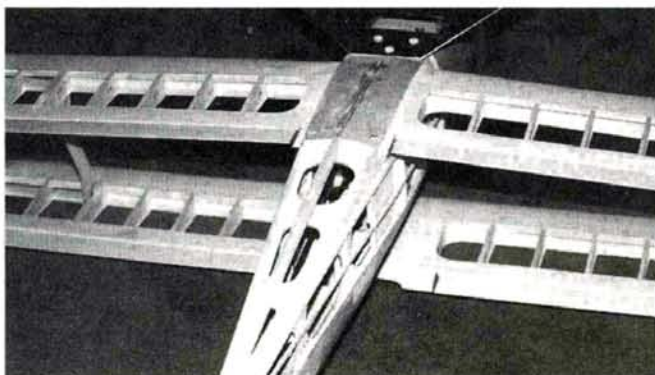


The fuselage has to be fattened up a bit with the addition of formers and stringers to the stock fuselage structure. The firewall is also moved back 2 inches.

ENGINE COWL AND LANDING GEAR

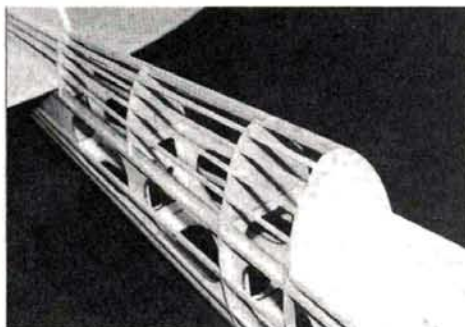
The engine cowl I fabricated uses the front portion of an old Sig Liberty Sport cowl, which looks very much like the front of a Pitts cowl. I discarded the rear portion of the Liberty's cowl and replaced it with 1/64-inch plywood. I then covered the plywood with 3/4-ounce fiberglass cloth and epoxy resin. I then mounted my O.S.* .91 4-stroke engine and carefully cut an opening in the cowl to accommodate the

Left: the bottom of the fuselage is given a gentle curve by adding a spline and a broad, boxed-in fillet under the bottom wing. Far right: with the addition of a new cowl, rounded tail feathers and a broad aluminum landing gear, the modifications to the Hog Bipe are basically complete.



cylinder head and muffler. The Hog's narrow, aluminum landing gear had to be changed, and I was fortunate enough to find a broad aluminum gear at the hobby shop to replace it. Add the stock Hog Bipe wheel pants, and the illusion is complete.

When I covered the model, I chose the classic Pitts red with white and black trim.



After the cockpit has been moved back 2 inches, the aft turtle deck has to be raised with the use of formers and stringers; then it is covered with 1/32-inch plywood.

I used the top of a pop bottle to form the windshield for the open cockpit and added some black rubber cockpit combing. When I was through, my Hog did indeed look like a Pitts—but would it still fly like a Hog Bipe?

WHEN HOGS FLY

When spring finally came, I took the model to the flying field to see how it would perform. The finished model

The result of the Hog-bashing modification. Sure looks like a Pitts, don't it?

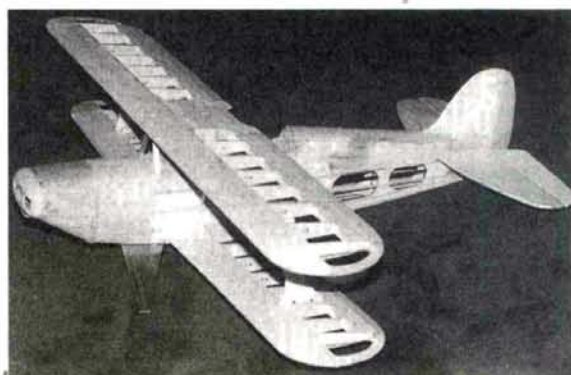


weighed close to 9 pounds (about 1 1/2 pounds more than the stock Hog Bipe). The CG was set at 4 1/8 inches back from the top wing LE. The O.S. .91 turning a 13x8 prop provided more than enough power, and the model lifted its tail and took off gracefully.

While very little trim was required, it was obvious that 3/4 inch up and down on the elevator throw was too much, and the model was overly sensitive in the pitch axis. The roll rate and the climb capability, however, were just right for a Pitts.

Back at the shop, I reduced the elevator throws to 1/2 inch each way and added 4 ounces of nose weight to move the CG forward. The next day, the model was a lot more stable and flew beautifully. The icing on the cake was that the model landed like a good trainer. What I have now is a model of a Pitts Special that sorta flies like a Sig Hog Bipe—close enough to what I wanted. If you don't have anything to do next winter, why not give Hog bashing a try.

**Addresses are listed alphabetically in the Index of Manufacturers on page 118.*





Scratch-Builders' CORNER

by GEORGE WILSON JR.

WORKING WITH METAL

WORKING WITH METAL is not difficult, even for modelers who have limited workshops. Much can be done using just a few hand tools. Scratch-builders can build with "store-bought" wheels, landing gear, linkages, etc., or be "purists" and make all or almost all

it is to stress cracking. On the other hand, hardened aluminum is "springy" and therefore makes good landing-gear struts.

If you are fortunate enough to have a "metal-bending brake," you can set up the bend radius before making the bend. If you use a bench vise to do your bending, be sure it has a round jaw. You can make a round jaw by filing the corner of a piece of angle iron to the radius that you wish for the bend. After you use it, store it away for next time.

Drilling sheet metal is easy using a machinist's drill. Carefully mark the location where you want the hole and make a starting dimple there with a center punch. Remove burrs around the hole using a larger hand-held drill or a file.

Machinist's drills are available in many sizes both numbered and fractional. A no. 80 drill is 0.0135 inch in diameter; large drills over an inch in diameter are also available. These drills work best when used in a drill press but also work well when used in mechanical and electrical hand drills. Large drills should be operated at slow speeds and, therefore, in a drill press. Clamp your work to ensure that the drill does not catch and force the work to rotate or, worse, throw it off the table.

Large, odd-shaped holes can be cut using

a series of interconnecting small drill holes and later filing the edges. You can also use a "nibbler"—a tool that takes many small bites (nibbles) of the metal to enlarge and shape the hole. Machine-shop tools, such as shapers and milling machines, can also be used but are usually not available to hobbyists. Other metals generally follow the same rules as aluminum. Brass and steel can be soldered, but aluminum soldering/brazing is tricky and best left to the experts.

WORKING WITH WIRE

Most wire used in model airplanes is "music wire," which is really hardened



A landing gear cut and bent out of hardened aluminum. Drill the holes while the blank is still flat.



This sheet-metal bending brake makes very nice bends because you can control the bend radii.

that is needed. It's best to start by buying and shift to making as you gain experience; to be a scratch-builder, you don't need to take a trip to the South American jungle with an ax in hand!

WORKING WITH SHEET METAL

Aluminum is the sheet metal used most in model airplanes. Soft aluminum can be bent and cut easily. Hardened varieties resist being bent and are more difficult to cut. Both can be cut with a hacksaw by hand or by using bench, jig, or band saws. Rough edges can be smoothed using relatively coarse files or sandpaper.

To prevent "stress cracking" and the consequent breakage at the bend line, avoid making sharp bends. The harder the metal, the more subject



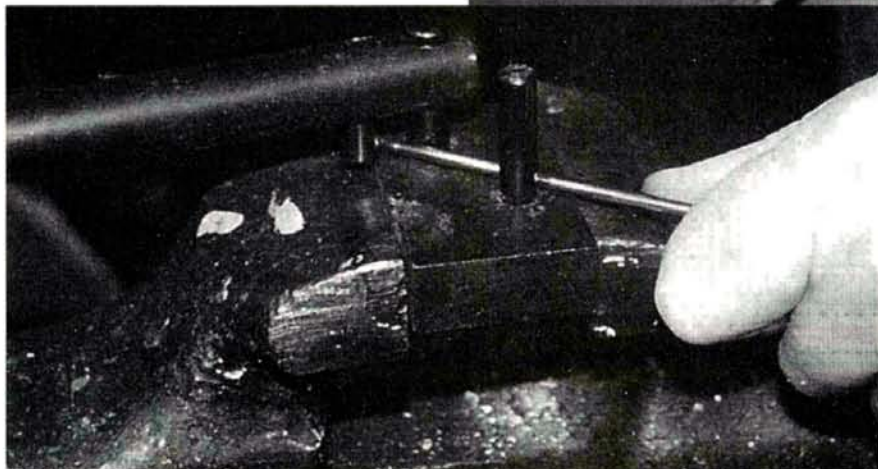
You can make nice bends in a round-jaw bench vise. The jaw shown here was made of a piece of angle iron. Use a wood block and a hammer to avoid hammer marks at the joint. If your vise has rough jaw surfaces, make "soft jaws" from aluminum angle stock.

PHOTOS BY GEORGE WILSON JR.



A round jaw made of angle iron stock and soft jaws of aluminum angle stock.

steel. Copper wire is used for electrical wiring and to assist in making soldered music-wire joins. Avoid making sharp bends in music wire. It can be bent around rounded vise jaws or with bending tools. You can use a coil-winding tool to form coils like those needed for nose-wheel struts. Thin wire is easily bent using pliers, but again, avoid sharp



This bending tool ensures that the bend radius will be great enough to avoid stress cracks. Use round-jaw pliers or a round-jaw vise to bend thin music wire. You may need to use a hammer to form the bend.

bends, as they will break when stressed. Round-jawed pliers are helpful.

Thin music wire (and softer wires) can be cut using pliers with cutting blades or with pliers that are specially made for metal cutting. Trim the ends with a fine file or a grinding wheel. Music wire that's $\frac{1}{16}$ inch in diameter or larger is best cut by grinding or filing it about halfway through and then breaking it by hand. Table-mounted or hand-held grinders will do the trick. The ends can be very sharp, so be sure to trim them with a file or a grinding wheel. Saws are useless when it comes to cutting most wire.

TAPPING AND THREADING METAL

There are many times when tapped or threaded holes are needed. Again, taps come in many diameters and threads per inch. Some popular sizes used in models are:

Size and threads/in.	Diameter (in.)	Tap drill no.
2-56	0.089 ($\frac{3}{32}$)	50
4-40	0.116 ($\frac{1}{8}$)	43
6-32	0.144 ($\frac{5}{32}$)	36
8-32	0.170 ($\frac{11}{64}$)	29
10-32	0.196 ($\frac{13}{64}$)	21
$\frac{1}{4}$ -20	0.250 ($\frac{1}{4}$)	7

There are several types of taps. Most used by modelers are regular tapered and bottoming. Regular tapered taps start easily into their prescribed tap holes. Bottoming taps will cut threads almost to the bottom of the tap hole. If you need threads all the way to the bottom of a blind hole, it is best to use a regularly tapered tap first and finish with a bottoming tap.

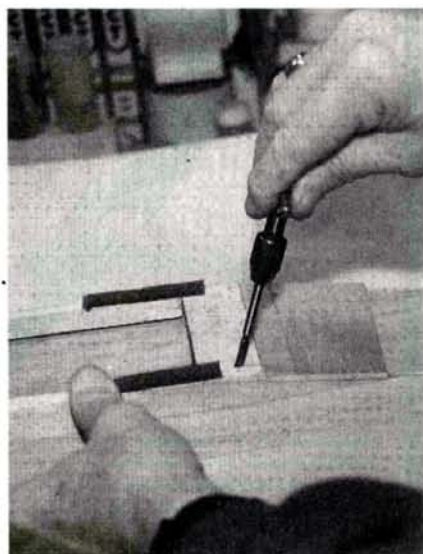
Tapping is done by advancing the tap using a tap wrench (I prefer the T-handle type) a turn at a time and each time backing it off a half turn to "clear



Make holes in metal with a hand drill or a drill press. When you use a large drill, clamp the work to the table to prevent it from rotating or being thrown off the table.

the threads." Use household or motor oil to make the tap work more easily. Do be careful that you do not force the tap and break it. Removing a broken tap can be very troublesome, and profanity does not help!

If you're tapping a deep hole, you'll occasionally need to remove the metal chips from the hole. Back the tap out and then dump the chips out. A blast or two of compressed air is helpful.



Here a 10-32 tap is used to thread the holes for the nylon wing hold-down bolts. The tap is in a T-handle. These handles make it easier to tap holes in less accessible places. Harden the threads in wood with thin CA.

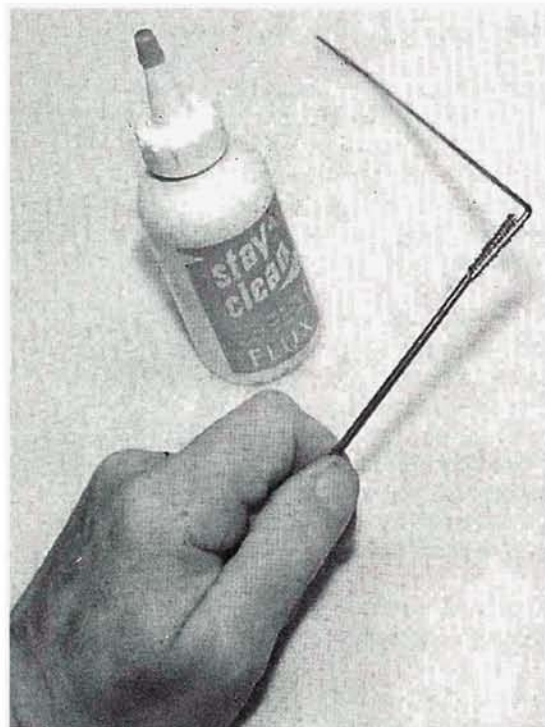


Regular taper (left) and bottoming taps (right). Start the threading with a regular taper tap and finish with a bottoming tap.

Gerry Yarrish's "Scratch-builders' Corner" column in the December '95 issue of *Model Airplane News* describes how to drill and tap for engine mounts and is a good source of tapping information. The sidebar to that column, "Securing Threaded Joints," is also recommended.

WORKING WITH METAL TUBES

Hard and soft brass and soft aluminum tubes have many uses in models beyond the plumbing for engine fuel. Typically,



This music-wire joint is wrapped with copper wire before soldering. When the joint is heated (use plenty of heat), the solder will flow into the copper wire and then onto the music wire. Joints made this way very seldom break.

A "SCRATCH" NOTE

Route pushrods in the straightest possible way because bends will make them more flexible (and less effective). Use guides to keep them straight when they are being used to "push" a control, as they may bend under load (either pushing or pulling). This also applies to coaxial (nylon/nylon or nylon/wire) pushrods. Support them as frequently as practical but only attach or glue them at the control end. This will allow them to expand and contract without buckling between the support points.

a metal tube may be used as a bushing inside a wheel axle hole to reduce the hole's diameter. You can easily cut a metal tube by filing (or sawing) it part-way through and then breaking it by hand or with pliers. Trim the ends with a file or sandpaper.

The most difficult thing about working with tubes is making smooth bends. Hobby shops sell tools for doing this; these are well worth their cost and should last for a long time.

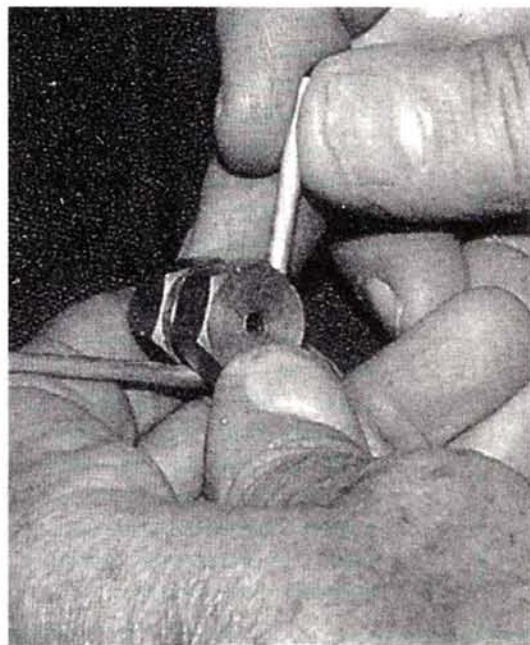
Flats and crimps in a metal tube weaken it and invite holes and leaks if it is used in a fuel system.

SOLDERING

This subject was covered in my "Basic Soldering Techniques" article that appeared in the April '93 issue of *Model Airplane News* and in Air Age Publishing's "R/C Airplane How To's, Vol. 2." They are recommended reading.

Briefly, solder can be used to join steel, brass and copper to themselves or to each other. The metals must be clean (use sandpaper, a file, a scraper, or a wire brush) and, in some cases, you will need a liquid or paste-type flux. You need a strong flux to solder stainless and plain steel.

The soft solders most often used are 60/40 (tin/lead mix) and 95/5 (tin/silver mix). The first is used to make electrical connections and often comes with a core of flux to make it work more easily. This 60/40 solder can also be used for mechanical joints, but the 95/5 solder used by plumbers is stronger and, therefore, a better choice for mechanical joints. The 95/5 solder melts at a higher temperature than



It is very difficult to bend a metal tube without collapsing it unless you use a bending tool. This photo shows a right-angle bend being made using one type of bending tool.

60/40 solder. Silver solder and its flux are available from hobby shops and are even stronger than the other solders mentioned.

All of these solders can be worked with soldering irons. Those that require a torch (frequently called "brazing solders") are harder to use and require special fluxes, but they do produce very strong joints.

The basic trick to soldering (after cleaning and fluxing) is to heat the *metals* that you are working with. When the metals are hot enough, they will melt the solder and it will flow into the joint to make a strong bridge. Obviously, the iron must be large and hot enough to accomplish the task.

Working with metals is a great way to expand your model building beyond the limitations of buying available parts. You are free to "do it your way," which is the very essence of scratch-building. ✚



Golden **AGE** OF R/C

by HAL deBOLT

REMEMBERING FLYING BISONS

Sorry to say, the column will be a sad one this month. Although God has blessed me with a long life (and a fine one, for which I thank him greatly!), I have the unfortunate task of sharing the news of our friends and colleagues who have passed on. Our generation has seen modeling from its beginning until now, and our wonderful hobby is now losing many renowned modelers fostered in our era.

A lifelong modeling friend and Flying Bison, 74-year-old James Moynihan, passed on a short time ago. Jim was a lifelong resident of Williamsville, NY, and more recently of Leesburg, FL. His many friends will recall his everlasting smile and happy character. Jim spent his life well in a business that contributed to the community by engineering pumping stations for utility companies.

Jim Moynihan was another master model builder, and his creations were immaculate works of art. He modeled any scale subject that suited his fancy for display, and just as often, for flying. He wasn't competition oriented; his joy was the exuberant beauty of flight.

Today, we think of the large, well-attended Toledo R/C Show as one of the nation's greatest, but Toledo actually began in the smallest of ways. It was conceived by the Detroit R/C Club, which conducted the first show in a small room of a log-cabin bar on the Detroit-Toledo highway! Some Flying Bisons, including Jim Moynihan,



At a 1952 Flying Bison meeting, leader Jim Moynihan (center) contemplates the first R/C model the club had ever seen. Auxiliary batteries were required for the extended demonstration.

attended. When it was suggested that the Flying Bisons should consider sponsoring the show, Jim's reaction was, "Let's do it!"

The president of the Flying Bisons, Harold Keller, chaired the first Buffalo R/C Show. As you may already have guessed, Jim Moynihan did much of the groundwork, which included find-



OT RC'er Wayne Kobes (right) and his flying buddy display Wayne's Senior Falcon, which is lowered by parachute when desired. We really needed something like this in the early days!

REV. WAYNE KOBES AND HIS 'CHUTES

I recently requested that OT R/C'ers write to tell us what they are doing. Rev. Wayne Kobes of Eureka, CA, responded with his interesting R/C exploits.

Wayne is another modeler who goes way back, having been enticed into modeling by Cedrick Galloway in 1930s Minnesota. Except for his wartime Marines tenure, he has modeled ever since. In the early '30s, the only game in town was "stick and tissue" rubber power. With Wayne, it seems that fascination has never left. In spite of enjoying engines, gas models and R/C, he still keeps his hand in modeling basics. Although he has enjoyed many, many kit types, in recent times he has drifted more and more into scratch-building. With nostalgia in mind, à la the Society of Antique Modelers, he has equipped many OT "gas jobs" with R/C. He finds them very enjoyable and relaxing to fly.

Wayne does seem to have a minister's outlook, as he believes modeling can be a great—though seldom noted—education for young people; it teaches many varied abilities that are useful throughout life. Wayne goes out of his way to encourage young people to join us, and he offers help. I, for one, second his philosophy!

As with many other OT'ers, Wayne has found time after retirement to take a look at ideas he never had time for previously. For example, in the early days, how often did you wish there was some way to save that errant plane? Did you ever think a parachute might be the answer? Wayne gave it a try. He told us about a chute-equipped Senior Falcon that has parachuted down a number of times! He also told us that the Falcon carries gliders up nicely ... a real R/C workhorse!

He labeled another unusual endeavor "Pandora's Nightmare." With a pylon configuration, it uses twin engines: an O.S. .20 on the pylon and a .40 in the nose—most unusual! He was surprised by its fine performance and even its inverted flight!

In Wayne's retirement community, many modelers at the local field are in their later years and still active in building and flying. At age 75, Wayne still loves to build and gets out to fly with the aid of his many modeling friends. It seems activity, including modeling, does help us to at least think we are still young! Wayne paraphrases General MacArthur: "Old modelers never die; they just keep modeling and enjoying their golden years!"

Wayne's Falcon and chute on the way down.



ing an abandoned school in which to hold the show. Those who attended that first show will remember that there was no heat—in Buffalo, in January! The Buffalo shows continued for 15 years, with genial Jim Moynihan hosting a majority of them. Along the way, he guided the show into more of a social affair than a commercial one, enjoyed by a great many R/C families. When rising costs became too much for the Flying Bisons to handle, it all ended.

Jim's modeling got him interested in full-scale aviation, and his pride and joy was an immaculate Cessna. As an aside, Bell and Curtiss Aircraft

Soaring Museum at Harris Hill, NY, Jim built a suitable 1900s-era Chanute glider for them. He also saw to it that Don Hoble, another Flying Bison, built a suitable model of the Pratt-Reid. The stories of Jim's other accomplishments would fill a book.

Jim's western New York associates and many friends made through the Buffalo R/C shows will surely miss him. Of course, I head that list, and we all pass on our heartfelt sorrow to his lovely wife, Mary, and his son, James.

I should note that Fran Ptaszkiewicz thoughtfully passed along to us the above and the following information. Fran is also one of the remaining Flying Bisons.

We've lost another cherished modeling friend: Martin Sehl, who was also a founding member of the Flying Bisons. That's pre-R/C! Martin lived in the Buffalo area and served the community in government work. Marty was a stalwart club member and an excellent modeler and flyer—a genuine OT R/C'er who bypassed the early radio miseries with a C-S 465 in an LW Champion.

In those days, a change of pace from the Champ seemed like a good idea. The full-size Piper Super Cub had just arrived on the scene, and it seemed a likely new image for the Champ basics. I shared my thoughts with Marty, and he offered to build the prototype model, doing his usual excellent job. To his credit, that LW Super Cub is now in the AMA museum! From his beloved modeling world and the Flying Bisons go our condolences to Martin's family.

ANOTHER MASTER MODELER

To appreciate this scene, you should be aware of the Patuxent Naval Air Test Center in Patuxent River, MD. It was here during WW II that the Patuxent Model Engineers AMA club was founded; this led to the establishment of model and hobby clubs on Navy bases and some ships. 'Twas a good thing for many modelers, including me, but that's a long story

As they do in any club, members acquired especially close friends. At Pax River, mine were Paul Heisler, Bob Dishong, Bernie Millet, Harvey



The late James Moynihan and fellow Flying Bison Don Hoble at the National Soaring Society Museum. Jim and Don provided the models for a museum exhibit.

Thomasian and Matthew "Matty" Kania. It's difficult to comprehend, but of these, I believe there are only two left: Harvey and me. As I write, Matty Kania passed away a few days ago.

Matthew Kania spent his productive life in Philadelphia; his major work was as an engineer with Exide Batteries. About 20 years ago, Matty retired to Cape Coral, FL, where he was a solid member of the local club. He was at the flying field on Friday and died on Sunday; typical modeler?

Our Pax River club was on the leading edge of control line at the time. After he was discharged from the Navy, Matty passed along his abilities as a model designer with the Megow and Sterling model companies. His control-line Ringmaster and free-flight Ranger designs are an everlasting part of our heritage.

Matty was another master modeler; not even a magnifying glass would reveal a flaw in his workmanship! We all have our quirks, and one of Matty's dumbfounded us at Pax River. When you or I finish a model, we can hardly wait to fly it, right? But when Matty finished his model, he would set it on top of his locker, and we would not see it again for two to three weeks. Only then would there be a flight or two! Perhaps there is an advantage to this that we have overlooked.

At Pax River, Matthew Kania was a credit to his country—another fine gentleman from our generation who helped develop this hobby/sport, and one whom we will surely miss almost as much as his fine family does.

A sad edition of "Golden Age of R/C"; I hope there will be more positive thoughts next time! Perhaps this discussion of the Buffalo and Toledo R/C shows will spark some cherished memories; please share them with us. ✦



Some of the original Patuxent Model Engineers. All have passed on, with the exception of Hal deBolt (lower left). Matty Kania is on the lower right.



The late Martin Sehl of the Flying Bisons displays his Champ Biplane (one of the first experiments with R/C biplanes). Hal deBolt holds his LW Custom Biplane. This photo was taken at a Willow Grove Nats.

Companies are native to western New York, and when an embryonic aviation museum faltered, Jim stepped in. With his (and others') aid, the Amherst Historic Aviation Museum was able to flourish.

Along with other extensive endeavors, Jim was president of the Buffalo Aero Club. When the National Soaring Society planned an exhibit for the



R/C CYBERNEWS

by JIM RYAN

LIGHTWEIGHT DESIGN PHILOSOPHY

IN THE LAST THREE COLUMNS (October and December '97 and February '98), we looked at three different ways of transposing a paper 3-view into the CAD environment as a basis for designing a scale model. The beauty of this approach is that you start with an absolutely accurate outline, and any deviations from scale are either by choice (to improve flight characteristics or simplify construction) or because of building error (no computer can fix that!). That's an important point; many kit ads these days proclaim that the model is "computer-designed for perfect fit." The fact is that the computer is not designing the model, the designer is, and he can make the same design errors with a computer as he would make with a pencil and T-square. CAD is a tool—not a panacea for poor design work.

Having completed the 3-view, we're now ready to design the actual airframe. This consists largely of filling in under the skin with supporting structure; because we're designing a model that mimics a full-size aircraft, we design from the outside in, rather than from the inside out. Before getting to the actual nuts and bolts of designing the structure, I'll look at scale deviations and lightweight yet simple structures for scale models. This will serve as a useful building block for the next installment.

INTENTIONAL SCALE DEVIATIONS

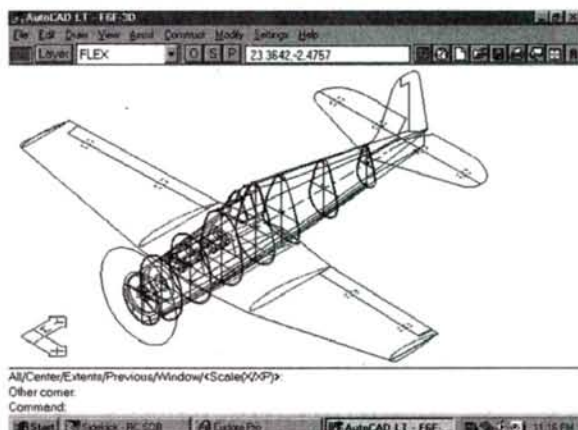
I very rarely make major deviations from the scale outline; as Dave Platt

has so often said, if the original flew well, your model should, too. When I designed my electric Hellcat (see "F6F Hellcat," July '97 *Model Airplane News*), I went out on a limb by doggedly sticking to a scale fuselage outline. I was concerned about both the weight and drag of the fuselage of this radial-engine fighter, but the whole reason for doing a Hellcat was that I liked the aircraft.

There are few things that bother me more than "scale" models that look as if they've been to Nutri-System because the designer replaced sheeted surfaces with stringers. As things turned out, neither weight nor drag was the problem I expected it to be. By using thin sheet stock for the skin and carefully designing the internal structure, I had a Hellcat that weighed only slightly more than a slender sport model. And the performance exceeded all expectations; in spite of the large cowl blanking out over 50 percent of the prop disk, the little fighter had a surprising top speed and as much vertical as I could hope for. There are plenty of other examples of the same simple truth; time and again, you'll see sup-

posedly unsuitable scale subjects flying very well indeed, from Polikarpov I-16s to F-117 stealth fighters.

Bear in mind that the only "fixed" weights in the aircraft are the powerplant and radio. The weight of the airframe can be managed (within limits) to meet the desired all-up weight goal, often with little effect on overall strength. The point is, rather than looking at a subject like the small-winged Bf-109 as a plane with too little wing area, you can think of it as a plane that needs to have a very lightweight fuselage. This doesn't mean it will be easy, but it is possible.



This 3D wire frame of my 30-inch-span electric Hellcat shows the secret to its lightweight yet tough structure. It uses more formers than would be typical on a model of this size, but the formers are thin 1/16-inch sheet. This allows the use of thinner fuselage sheeting, thereby saving weight. High-stress areas are reinforced with triangle stock or glass cloth.

Another possible reason to deviate from scale is to simplify construction, and this is something I frequently do. Nearly all my models fit under the general heading of "sport scale," and I like to make my life easy whenever I can. So if eliminating a slight compound curve in the fuselage will let me plank it with simple sheet stock, I usually do it. Frequently, these deviations can be hidden so they're only apparent under very close examination. For example, the MiG-15 has a generally circular fuselage, but toward the tail, it's not quite round. When I designed my MiG-15 ducted fan, it was obvious that I'd be able to save myself a lot of trouble if I could turn the fuse plug on my foam lathe (see "Foam-cutting Techniques," May '97 *Model Airplane News*). Since you would have to look very closely to notice that the fuse of the full-size MiG isn't perfectly round at the tail, this wasn't a hard choice to make.



This simple electric fun-scale model spans 50 inches, and yet the glassed and painted airframe weighs under 14 ounces—about 1/3 of the all-up weight with hardware installed. It has held up for well over 100 flights and some mediocre landings.

GENERAL STRUCTURAL CONSIDERATIONS

Next, I'll talk about structural considerations and material selection. Obviously, the rules that apply for a Speed 400 electric model that weighs less than 1 pound do not apply to a 25-pound ducted-fan model. It's beyond the scope of this column to consider all contingencies; instead, I'll look at some rules of thumb and present some ideas for consideration. Some of my suggestions might drift close to heresy, and you're welcome to follow or ignore them at your discretion.

• **Flying surfaces: foam versus built-up.** For years, modelers have argued about the benefits and liabilities of built-up wings versus wings with foam-cores. It's widely held that a built-up wing will be lighter than its foam counterpart, but that's a simplistic view. First of all, many modelers use the same thickness of skin on a foam wing as they would use on an equivalent built-up wing, and this ignores their relative failure modes. Because of the high compression resistance of the

small. If the model has a very thick wing section or if you're going to install retracts and other mechanisms, however, the benefits of the foam wing diminish and might disappear entirely.

In the end, there's a lot of room for personal preference. In my view, foam-cores are the logical choice for straight, tapered wings that don't have retracts, especially if the model has a relatively thin foil section. But I quickly lose interest in foam when I have to butcher the cores to install retracts, drop tanks, flaps and other mechanisms.

Having made the foam-versus-built-up decision, you need to decide whether the wing should be fully or partially sheeted. It's popularly assumed that foam wings will always be fully sheeted, but I've built many foam-wing models with sheeted leading and trailing edges and capstrips in between, just as I might do on a built-up wing. Once covered, the wing looks just like a built-up structure but is much more

durable. Still, I generally lean toward fully sheeted wings for my scale subjects because I prefer to glass and paint my models; glass cloth can't be used over open structures.

• **Material selection.** What thickness of stock to use? Master modeler Greg Hahn uses nothing thicker than 1/8-inch balsa

planking, even on his giant 118-inch-span B-25. That being the

case, you have to ask yourself why so many .40-size sport models have 1/4-inch-thick fuse sides! To sheet foam cores on anything up to a small .40-size model, I use 1/32 balsa. For large .40s on up, you need the strength of 1/16 sheet. Only my larger foam wings have spars. For a built-up wing, I'd use 1/16 sheeting up to models around .90 size. If necessary, I use 2-ounce fiberglass cloth "doubblers" on the interior surfaces to reinforce high-stress areas like the wheel wells. These are only rules of thumb, and you might need thicker skins to allow for vibration, extensive cutouts, high-G loadings, or other factors. The point is, I lean

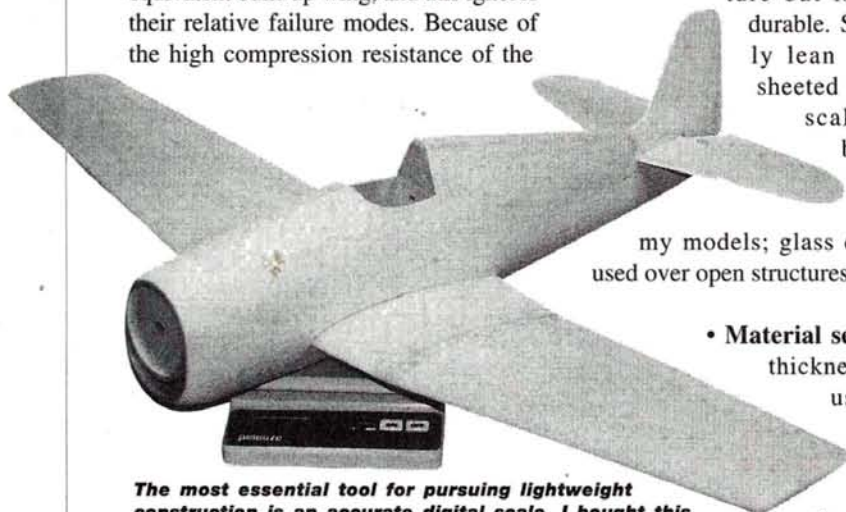
toward building structures far lighter than most, and I haven't had a wing break in flight yet.

The same points apply to fuselage structures. By using thinner stock and adding reinforcement only to the high-stress areas, it's possible to build very light models. You just need to apply some common sense and consider the failure modes of the average model. Where will it break? Will fatigue be a problem? Can soft engine mounts reduce vibration enough to allow a lighter structure? I recommend 1/16-inch fuselage skin on models up to .20 size, 3/32-inch on .40- and .60-size aircraft and 1/8-inch on .90 or larger planes. This seems very thin, but I'm careful to reinforce the high-stress areas, usually with glass cloth "doubblers," and I use enough formers to adequately support the skin. Bear in mind that full-size aircraft are covered with thin aluminum sheet, but it's properly supported, and they hold up just fine.

While we're on material selection, I'll step on a few more toes. Folks, lite-ply is a very poor bargain from a strength to weight ratio point of view; it's brittle and not light. Electric flyers who have to make every ounce count know this, and when they convert a kit to electric power, the lite-ply parts are the first things they replace. Now, this doesn't mean that manufacturers are wrong to use it. Lite-ply is a cheap and consistent material that helps to keep kit costs down and in many cases simplifies construction. But why anyone would use it in a scratch-built project is beyond me. It's both easier and more weight-efficient to use either thinner birch ply or balsa with suitable reinforcement.

• **Cutting holes.** Many modelers are big fans of cutting lightening holes. They buy high-quality Forstner drills so that they can drill holes in the wing ribs, tail surfaces, formers and anywhere else they can find. I've done some weight studies on this issue, and my conclusion is that it takes a lot of holes to save any weight. For example: for 1/8-inch-thick sheet stock of 6- to 8-pound-density balsa, it takes 157 1-inch-diameter holes to save a single ounce! Having realized that, I now bore holes only in heavy plywood parts. Again, I like to make my life easy.

I've tried to summarize my philosophy of simple but lightweight design. As in most other aspects of aeromodeling, there's plenty of room for personal pref-



The most essential tool for pursuing lightweight construction is an accurate digital scale. I bought this unit, which has a capacity of 5 pounds, from an office supply store for about \$50. I weigh the airframe throughout construction, both to keep tabs on the weight and to expand my knowledge for future projects.

cores and the high tensile strength of balsa, you can use thinner skins on a foam wing. The beauty of foam is that you don't have to use thicker skin to avoid poking a finger through the wing; the solid cores take care of that.

The other factor that influences the weight of a foam wing is a simple truth that's often overlooked: the thickness of the foil section. The thin wing of a pylon racer or sailplane has much less volume than the thick wing of a fun-fly model, and its core will therefore weigh less. The foam-cores for a small racer might weigh 1/2 ounce or less, so the potential savings for a built-up wing are very

erence, and these aren't intended to be unbreakable rules. But I do hope you'll take another look at your own building practices. Lightweight models fly better, live longer and even cost less to build! Next time, we'll get down to the details of using a CAD 3-view as a basis for a working set of construction plans.

WEIGHT ESTIMATION THE EASY WAY

Time and again, someone will bring his latest creation to the field for the maiden flight. All present will be cooing over the masterpiece when someone asks, "How much does it weigh?" More often than not, the builder doesn't know. I quite frankly don't know how anyone can form expectations about a model's performance when he has no set weight budget. Wing loading and power to weight ratio are the two biggest factors in how an aircraft will fly. Now, wing loading can be reduced by increasing the wing area (and overall size), and power to weight ratio can be increased by installing a bigger engine, but each solution adversely affects the other. Reducing the weight, on the other hand, pays dividends on both ends and, better yet, it doesn't cost anything!

The point is that you should always have a weight budget before you pick up the first piece of wood, and you should spare no effort to meet your goal. Often, simply having a goal will shave ounces or even pounds off a project. You see, like people, airplanes don't get to be overweight because of a single error in judgment; they pick up the surplus pounds a few grams at a time. If you're thinking about weight all the time, you'll think twice before you fuelproof the engine compartment with an 1/8-inch-thick layer of epoxy or apply "just one more" coat of paint.

Thinking about weight control is all well and good, but your ability to follow through is limited unless you can make accurate forecasts of the finished weight of the aircraft. The pencil work required can be tedious, but it's an ideal application for spreadsheet programs like Microsoft Excel and Lotus 123. In its most basic form, a spreadsheet is a program that allows you to create a sort of "template" that will perform a set of mathematical calculations over and over again. You can change one or more of the variables, and the spreadsheet will update all values instantly. This number-

crunching capability is ideal for checking a series of scenarios for a model quickly and painlessly.

Figure 1 shows a weight-estimation spreadsheet I use every time I contemplate a new design. The database sheet (Figure 2) contains the weights (as determined by my electronic digital scale) of all the hardware I own, and I simply pick them from the pull-down menus to get a total weight.

Now, such a database doesn't have to be assembled in one sitting; after all, I like to fly once in a while. I started out with a basic spreadsheet, and each time I needed something that wasn't in the database, I went to the shop, weighed it and added it to the program. Later, I added the pull-down menus and other features to make the spreadsheet a little more user-friendly.

Of course, there's the potential to use such a tool to estimate the weight of the actual airframe, and a skilled developer could design a spreadsheet with uncanny accuracy. Given factors like the wing area, length, skin thickness, surface area and type of finish, it would spit out a number within a few percentage points of reality. But such an undertaking would take more time than I'm willing to spend at this point. I estimate the airframe weight based on wing area, construction and finish, and I rely heavily on past experience. For my purposes, the function of this spreadsheet is to give me a starting point. If the model is too heavy, I can look at options like substituting smaller servos, changing the power system, i.e., using smaller Ni-Cd cells, or making significant changes in the structure (up to and including trying an entirely different size).

With all the hard work already done, I improved the spreadsheet to calculate the wing loading, stall speed and "power

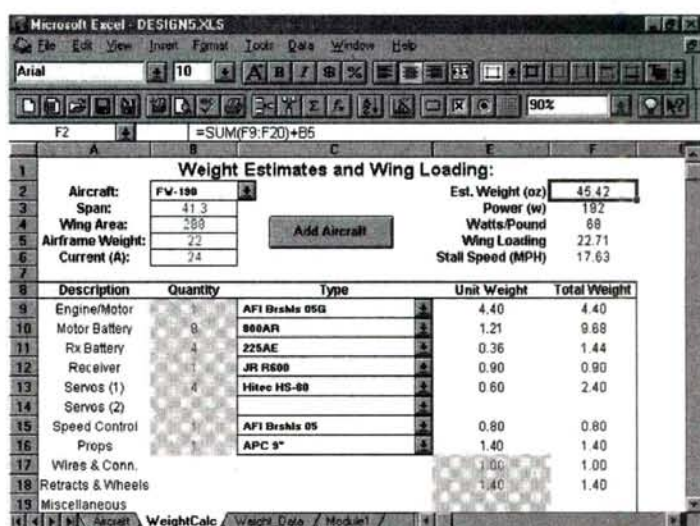
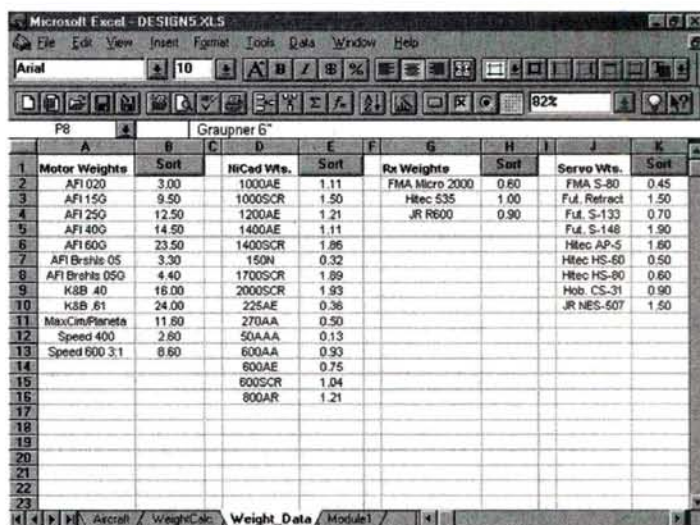


Figure 1. This simple spreadsheet allows me to select the hardware for a model from a series of menus, thereby giving a quick and reasonably accurate estimate of the finished weight.





Effective PROGRAMMING

by DON EDBERG

THINGS UNIQUE TO COMPUTER RADIOS, PART 2

IN THIS PIECE, I describe some more features that may *only* be found on computer radios ... and why you might need them. My last column on this subject (Part 1) may be found in the February '98 issue and covered storage of model setups, buddy box/training options, trim memory, electronic trims (description and comparison with mechanical trims), timing and clock functions. This time, we'll concentrate on special functions.

Note to our overseas readers: this column is admittedly biased toward R/C systems that are commonly available in the U.S. and may not include features that may be found on other fine systems that I do not have access to. If I leave out something that your system has, that's probably the reason. However, if I make a goof on something that's found in the U.S., please let me know! (This being said, if any manufacturers want their non-U.S. model features to be included in this column, they'll have to provide samples, or at least user's manuals, for this writer.)

SPECIAL FUNCTIONS

Special functions are one of the handiest things found on computer radios. These preprogrammed (built-in) functions are not like the ones we've talked about before, and they're not used for the simple things like setting servo travels or neutrals. Instead, they control how your model *flies*. I like to think of them as "higher-level" functions that can be used to enhance your plane or chopper's flying qualities.

Since the special functions are intended to enhance flying qualities and make setting up your model easier, you might imagine that there are different ones depending on the type of model that is being flown. As a matter of fact, this is correct and the reason the "3-in-1" radios are called

sailplanes each have different things that make them fly better, so the menus in the 3-in-1 radios are specialized for each type.

There are less expensive "2-in-1" radios that leave out the glider programming and concentrate on the powered models: aircraft and helicopters. Examples are the Futaba T6X and JR 642. However, cost is not always the discriminator: the JR PCM10SXII is available in separate airplane and heli versions. The airplane version has no helicopter programming, and the helicopter version has no airplane programming!

As I said before, some or all of these preprogrammed mixing functions are built into your system (in a future column, we'll discuss mixers and how they can be used to do things that aren't provided by built-in functions in your system). Of course, the functions in your system will vary depending on the cost of the radio and its age. Since powered aircraft are probably the most popular models flown, we'll begin with the preprogrammed airplane functions.

The functions you'll commonly find in the airplane menus of computer radios are shown in Table 1. Your system may not have all the functions described below. It's worth pointing out that some, but not all, of these functions may require additional servos to provide the proper enhancements. If you don't understand right now, this will become obvious as we look at each function.

FLAPERON FUNCTION

The flaperon function combines the "flap" with the "aileron" function. Generally you have to *activate* the flaperon function in your system's programming menu. You also have to plug the servos into the correct receiver channels. Usually, these are the normal aileron channel along with

that—because they have three different sets of special functions already installed for the three types of models typically flown. Aircraft, helicopters and

a second channel, which is often labeled AUX (for auxiliary) or something similar. To find out which channel you need to use, consult your owner's manual.

With the two servos correctly connected to two separate wing control surfaces, one on each side of the fuselage (one servo connects to each surface), the intent is that the servos move in opposite directions for roll (aileron) function, and in the same direction (up or down together) for flap function. This is illustrated in Table 1.

You can see immediately the advantage of the flaperon function; it provides full-span (if desired) ailerons *and* flaps with only two control surfaces; a separate flap servo is not needed! Thus, you get the best of both worlds: the enhanced roll rate due to full-span control surfaces, and the flap function, handy for maneuvering and landing.

Here are some hints on using the flaperon function. Before you activate it, be sure that the servo connected to the normal aileron channel moves in the correct direction when you move the stick. Then, you won't need to reverse it. With the flaperon function activated, be sure that the second control moves opposite to the first for roll control and the same direction for flap action. If it doesn't, reverse it in the flaperon function menu (usually there's a plus or minus symbol indicating throw direction), *not* within the normal servo reversing menu. Also, because you are trying to make your plane fly straight, you'll want to have the servo type, servo arms and linkages identical on both sides, to ensure that your throw amounts are the same.

One last comment: with flaperons, be careful to limit the maximum amount of down-travel in the flap mode. If the ailerons are drooped too far, you'll find that the roll rate drops *way* down and the plane becomes hard to fly. I'd suggest starting with less than 20 degrees of down travel, but you'll have to experiment to suit your own flying style and needs. You also might want to experiment with reflexing the ailerons instead, which is how the glider folks often make spot landings.

TABLE 1 COMMONLY FOUND AIRPLANE SPECIAL FUNCTIONS



Flap operation



Aileron operation

FLAPERON FUNCTION

- Two aileron servos required.
- Servos work opposite for roll (aileron) function, together for flap function.
- Gives strip ailerons and flaps with only two surfaces.



Differential function

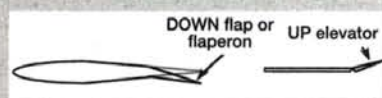
DIFFERENTIAL FUNCTION

- Two aileron servos required.
- Different up- and down-travel helps coordinate turns and reduces "adverse yaw" tendency.
- The down-moving aileron moves down less than the up-moving aileron moves up.



AIRBRAKE FUNCTION

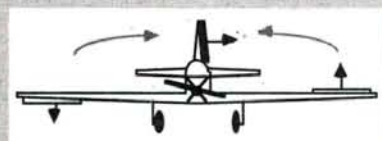
- Two aileron servos required.
- Servos work opposite for roll function, go up together for airbrakes (often slaved to throttle stick: low throttle activates airbrakes).
- Allows steeper landing approaches.



DOWN flap or flaperon
UP elevator

ELEVATOR >> FLAP FUNCTION

- Dual flaperon servos or single flap servo.
- When elevator is pulled, the flaps (flaperons) droop at the same time.
- Allows tighter loops and sharper corners on "square" maneuvers.



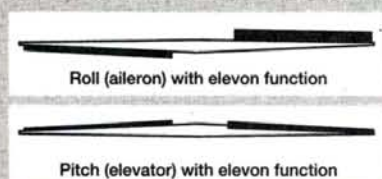
AILERON >> RUDDER FUNCTION

- Uses existing aileron and rudder servos.
- Reduces "adverse yaw" tendency and coordinates turns.
- When aileron is commanded, the rudder moves at the same time.
- Allows coordinated turns, scale-like flight.

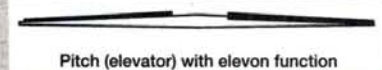


AILEVATOR ("taileron") FUNCTION

- Two servos for horizontal tail.
- Tails move together for elevator, opposite for aileron.
- Allows torque rolls at low speeds and "hovering."
- Still have elevator control if one servo fails.



Roll (aileron) with elevon function



Pitch (elevator) with elevon function

ELEVON FUNCTION (for tailless models)

- Dual servos provide aileron and elevator function on flying wings (tailless).
- Servos work opposite for roll function, together for elevator function. Differential is available.
- Combines ailerons and elevator function into only two surfaces.
- Airborne mixer not needed.

DIFFERENTIAL FUNCTION

The differential function gets its name from the fact that it provides *different* up and down throws for the two ailerons. Why might you need differential? Well, it has to do with how the model turns when you move the aileron stick (without inputting rudder, which we'll get to another time). It turns out that in a turn, the wing that is lifting more (this is the one with the aileron downward) also develops more drag. If you think about it for a

moment, this drag is acting *against* the turn and causes the fuselage to point or "yaw" away from the turn, termed "adverse yaw." This effect is greatest at low speeds and is reduced as the speed of the model increases.

To reduce the effect of this drag or adverse yaw, we reduce the amount of down-aileron so that the drag of the outside wing is reduced. *The differential function commands that the down-moving aileron moves down less than the up-moving aileron moves up.*

So, you might guess that it requires two aileron servos, as the flaperon function did. The second servo again goes into an AUX channel (though on some radios, it may be different from the one used for the flaperon function!). Again, consult your manual for the proper channel.

How can you tell if you need differential? Trim your model to fly level in a straight line. Then, gently rock the aileron stick back and forth. If the model's fuselage points straight

ahead, you don't need to do a thing. If it seems to "waddle" back and forth in sync with the aileron stick, then you have some adverse yaw and it will help to apply some differential.

It takes a fair amount of differential to have a noticeable effect. I'd start with a 2:1 ratio of up-aileron to down-aileron, but it may take a three- or even four-to-one ratio. Many radios will allow you to shut off the down-aileron motion entirely. This will help reduce adverse yaw, but you'll sacrifice roll rate as well.

AIRBRAKE FUNCTION

Some planes, especially the fun-fly types, like to land as short and steeply as possible. A special airbrake function has been designed for this purpose. For this function, you again need two separate aileron servos. The idea is that the two ailerons both move upward together (this is called "reflexing" the ailerons and is the opposite of drooping them) when the function is activated and the throttle is reduced below a certain threshold value. It's sort of like the flaperon function except that the flap motion is activated by the throttle stick's motion.

As I mentioned earlier in the flaperon discussion, reflexing both ailerons allows steeper landing approaches. Combining this action with what happens with reduced throttle means that the plane really comes down fast, but it's completely controllable if you've set things up correctly.

Usually, when you reflex the ailerons, you'll cause a trim change. For this reason, the airbrake function allows you to command the elevator to move in order to compensate for this trim change. If your system has the capability, you may want to droop the flaps (if you have them) at the same time. And if your radio is really hot, it will also allow you to set a delay in the speed that the elevator servo is commanded to move, so it doesn't outrun the ailerons, which have to move through a much larger angle. So there are lots of settings to be made and experimented with to suit your flying fancy!

With airbrakes, you'll want to start your setup experimentation at higher altitudes so you can see whether there's a trim change and discover how fast it comes down while you still

have time to react. If the trim changes, you'll either want to increase the amount of elevator compensation or decrease the reflex that is programmed into the ailerons. If it comes down too fast, just reduce the reflex of the ailerons.

ELEVATOR ➔ FLAP FUNCTION

Here's a special function that doesn't require dual flaperon servos; you can use it with single flap servo (of course, it works extremely well in conjunction with the flaperon function, too). The idea is to increase the lifting capability of the wing by dropping flaps when elevator is pulled. By doing this, you can make very tight loops, or really square corners during those "square" maneuvers. This function was pioneered in control-line modeling, but it works just as well with stunt R/C planes.

When you set up the elevator-to-flap function, be sure that the flaps drop with up-elevator and rise with down-elevator. Start out with small amounts of flap motion (say ± 10 degrees or so), and increase it until you are happy with the way the airplane turns and loops. Too much flap will slow the plane down by adding lots of drag.

AILEVATOR FUNCTION

Here's a special function whose name comes from a combination of the words "aileron" and "elevator" (note that Airtronics calls it "taileron," but it's the same thing). The ailelevator function requires two servos, one connected to each side of the *elevator*. To utilize it, your elevators must be able to move independently; they cannot be joined at the center. Of course, you will also need two pushrods, one for each side of the elevator. Typically, one servo plugs into the normal elevator socket, and the other plugs into an auxiliary channel socket.

When you command elevator, both elevators will move together to provide elevator control as usual. However, the fun begins when you command aileron. When it's set up right, the two elevators will move in *opposite* directions, providing an aileron type of control.

What on earth would you use this for? Well, these days, folks are doing lots of aerobatics at low speeds, where

the model is hardly moving. However, the slipstream from the propeller is still moving quickly, and it's traveling over the tail. The differential elevator throw allows you to roll the model at low speeds and even when it's "hovering," where the plane is hovered vertically just like a helicopter!

The ailelevator function provides a factor of safety as well. If you lose one elevator servo, you still have elevator control (although it's reduced and not symmetrical any more, it's still better than nothing!). Also, if you prefer to just have the dual elevator servos, you can shut off the differential part of the function and just use it for dual elevator control.

ELEVON FUNCTION

The last function we'll examine is called *elevon*. This word comes from a combination of "elevator" and "aileron" and is intended for tailless or flying-wing models that have only two controls on the wing, with two servos providing aileron and elevator function. It's very similar to the ailelevator function we just discussed, only it occurs on the wing instead of the tail. See Table 1 for more information.

Like the other functions we've seen, the two servos work opposite for roll function and together for elevator function. Usually, you can program differential (more up-aileron than down) as well. This helps to make rolls more axial. For example, on an Me-163 model I own, I use 100-percent up-travel in the elevons, but only 80 percent down travel. This is something that you need to experiment with for best results.

If you've ever needed an airborne mixer or a kludgy sliding servo arrangement for a flying wing, the elevon function makes things very simple; you don't have to worry about those anymore. Also, if you have a model with a V-tail but no ailerons, you can use the elevon function to control the V-tail (assuming, of course, that your radio doesn't have a V-tail function built in!).

Remember, if you want to write to me, send your self-addressed, stamped envelope to Don Edberg, 4922-N Rochelle Ave, Irvine, CA 92604, or you can email me at dynamic3@flash.net. I get lots of mail, so please be patient! ✦



Scale **TECHNIQUES**

by **GEORGE LEU**

WARBIRDS UNITE!

WARBIRD: the very word speaks volumes to scale modelers. So many different aircraft designs fall into this single category of scale model. From WW I biplanes to WW II fighters and bombers and even modern day jets—each in its own way stirs the emotions. Like it or not, the scale modeling world has a love affair with these deadly wartime designs.

It seems that this emotional link to warbirds and the national conflicts and events that they are associated with must be one of the reasons that model events with names like "Warbirds over [somewhere]" are so popular. Corsairs and Zeros seem to represent the Pacific conflict and Pearl Harbor, while B-17s, P-51 Mustangs and Me-109s arouse memories of the European war theater. The point I'm trying to make is that as long as we remember our history lessons, we, as modelers, will remember and want to build warbirds.

The World Miniature Warbird



This Meister Scale P-47D Thunderbolt was built by Ted Galbraith of North Weald, England. The model is powered by a G-62, has Century Jet retracts and weighs 39 pounds.

Association (WMWA) is a new organization especially developed for warbird lovers. This is an AMA-sanctioned organization that currently has 50 members. Scale modeler Dino Di Giorgio has taken up the task of forming this organization. Dino's thinking was that though there are many regional organizations specializing in warbirds, a large national entity could take warbird interests to a new level. After talking with many scale modelers, Dino started by writing a newsletter, "Wings of Valor," and asking the scale community what it would like to see in such an organization. The goal of the WMWA is to

help modelers who are interested in warbirds from all wars and national conflicts (WW I, WW II, Korea, Vietnam, etc.) exchange information and provide a place for them to come together and stimulate growth. The membership already includes such modelers as Jerry Bates, Roy Vaillancourt, the Zirol family, Frank Tiano, *Model Airplane News* editors Larry Marshall and Gerry Yarrish and yours truly. There are also members from Canada, England, Germany and Italy, and that makes it an international organization. There are still many ideas on the table, and with time, I'm sure we'll see good things coming from the WMWA. If you want to be part of this new organization, why not write or call Dino at P.O. Box 175, Succasunna, NJ 07876. His phone number is (973) 584-6096.

MEISTER SCALE

I have known Jim Meister for a number of years. Jim has been a competitor, a scale designer and, in my opinion, a trendsetter in scale R/C. Years ago, Jim developed the Jemco line of scale kits that were intended for .40 to .60 glow engines. These models flew well and could be built very quickly. They looked pretty good, too, when they were finished.

Seeing the growing trend toward larger models, Jim sold off the Jemco line and started to produce the Master Scale line consisting of the SBD Dauntless followed by a North American P-51 Mustang. These

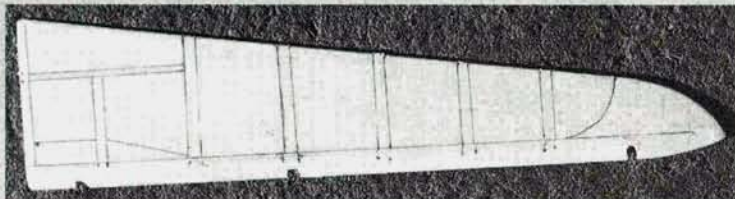


Good friend Dino Di Giorgio (left), shown here with his son Dean at the 1997 Top Gun Scale Invitational, is spearheading the new World Miniature Warbird Association.

SCALE STRUCTURES

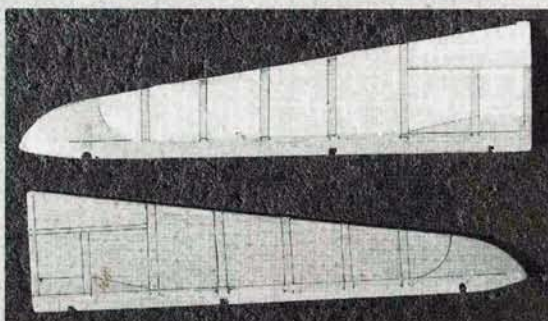
I have been working on a Bert Baker Aircraft Zero for my 1998 Top Gun entry. Bert's Zero is an excellent flying model but because it was designed in the 1980s, it will require a good deal of work to make it competitive with today's high standards. To add to the scale

ture detail. With the details marked, mask off the areas between them with either masking tape or liquid masking film. Now apply several more coats of primer (I use a brush) to build up the exposed surfaces and let dry before removing the mask. With all the masking



After priming and wet-sanding the control surface (here, an elevator from my Zero), I mark off the raised rib and internal structure areas with a pencil or felt-tip pen.

realism of the model, I am improving the appearances of the control surfaces—elevators, ailerons and rudder.



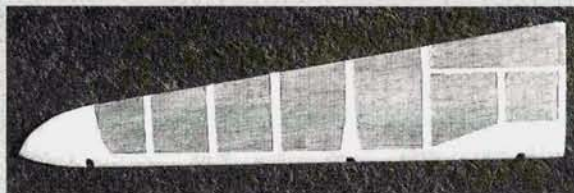
Here you see both elevator halves. Note that the bottom one has been masked off with masking tape. Once this has been done, brush on several coats of primer and let dry.

The full-size Zero employed fabric-covered control surfaces, and the underlying ribs and internal structural surfaces must be duplicated on the model. Since I did not want to build completely new surfaces, I came up with a rather simple method of replicating this detail.

Start by priming the particular surface and then wet-sand it as if you were ready to paint it. Now use a soft pencil or a felt-tip pen to draw on the internal rib and struc-

ture detail. With the details marked, mask off the areas between them with either masking tape or liquid masking film. Now apply several more coats of primer (I use a brush) to build up the exposed surfaces and let dry before removing the mask. With all the masking

material removed, use 320-grit sandpaper to sand the surfaces by hand and knock off the sharp edges of the raised areas. What you want to do is blend the raised surfaces evenly into the lower ones. You want the difference between the raised surface and the lower one to be subtle. Too little sanding will not remove enough of the surface, and the rib and structure detail will be too obvious. Varying the sanding pressure will also produce slight differences in the structure



Here I have prepared an elevator half that was not primed first to show the effect of this technique. Once the masking tape has been removed, all you have to do is hand-sand the raised edges and blend them into the lower surface. When this has been done, the control surface looks fabric covered and is ready to paint.

and give a scale effect equal to that of a fabric-covered control surface so typical of a WW II aircraft. Good luck.

planes were close to 1/5 scale and featured the same top quality and the unique "Jem-Loc" construction method for which the Jemco kits were known.

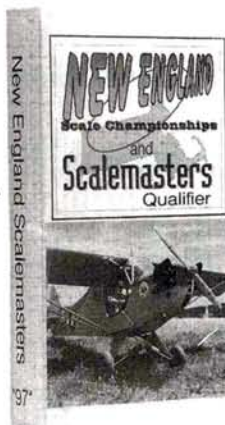
Today's trend toward even larger warbirds did not escape Jim's notice either. Meister Scale* offers many designs in the 90- to 100-inch-wingspan category; these include a P-47 Thunderbolt, a Messerschmitt Bf-109, an FW-190, an F4U Corsair, a Spitfire and a Zero, to name a few. These models fly "on the wing" and look very realistic when in the air. A few words of caution, however: if you decide to build one of these monsters, they are very BIG!

Dick Bernier is vice president of Meister Scale and has grown the service and accessories side of the business so a modeler can now either scratch-build one of these designs or obtain a complete kit, including engine and retracts. A call to Dick will keep you up to date on what is available. I recently acquired a Meister Scale P-47 Thunderbolt kit, complete with plastic parts, retracts, wheels, engine and cockpit interior kit. I have been very satisfied with their quality and customer service. If you want big, Meister Scale has you covered.

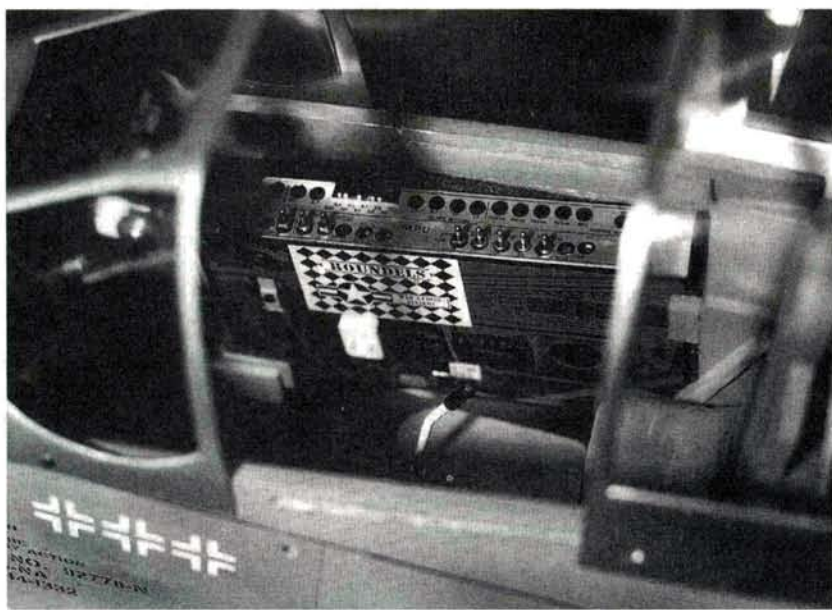
AMR PRODUCTIONS

Mike Roselli of AMR Productions* has been offering model airplane video tapes for a long while, and I always bump into him at scale meets. Recently, Mike added a new video featuring the 1997 New England Scale Championships and Scale Masters Qualifier.

Mike really gets into his video production and knows many of the modelers featured in AMR videos. Being so in tune with the modelers and their models, Mike presents detailed



The newest release from AMR Productions, the 1997 New England Scale Championships and Scale Masters Qualifier videotape.



Here's the control panel for the Omnionics War Games sound and light system. It blends into the scale cockpit interior nicely.

accounts of the events and avoids what I call "generic coverage." Each video includes close-up details of the models, takeoffs, flybys and landings and several interviews with the modelers themselves. Included in his newest release are Bob Pickney with his 1/3-scale military J-3 Cub, Jean Chevalier

and his Ryan STA, John Nicolaci's giant-scale, twin-engine, rocket-assisted takeoff Martin Mariner seaplane and "Mr. Warbird" Nick Zirolu with his P-38 Lightning, to name just a few. If you haven't already seen an AMR video, I suggest you check one out. Mike is also distributing the well-

known Squadron/Signal* "In Action" and "Walk Around" series of scale documentation books and, as always, will be at the WRAM show. Oh yeah, check out his Web page at warbirds@csionline.net.

THE SOUND OF WAR

Tom Lemar has created a really neat scale accessory: machine-gun sound effects with accompanying high-intensity lights in the wing guns. Called "War Games" by Omnionics*, the system is sold "ready to install" and features sound levels of 110dB measured at 10 feet. The miniature speakers in the system weigh only 3 ounces and measure 2.5x2.5 inches. The gun lights have a candlepower rating of 12,000 and rapidly flash when the sound system is activated. In flight, the effect is very convincing. War Games is powered by its own battery system and won't drain your radio battery pack. Tom designed the system's control panel so that it easily blends into a scale cockpit interior of any giant-size warbird.

* Addresses are listed alphabetically in the Index of Manufacturers on page 118. ✈

FARRELL FAREWELL

It is with great sadness that I report on the passing of my friend, Tim Farrell. At age 49, Tim died as a result of complications during bypass surgery. Tim held the position of chief judge at Top Gun for the past two years and designed and flew scale models for many years; his latest project was a 1/3-scale Fokker Dr.1 triplane. Tim will be missed by many in the scale community.

Seen at the 1997 Rhinebeck WW I Jamboree: Tim Farrell, with his original design, 1/3-scale Fokker Dr. 1 triplane. Tim passed away last year.



LATEST PRODUCT RELEASES



SPECIALTY PRESS **Convair B-58 Book**

Specialty Press is expanding its Aerofax series of aviation books with a new volume on the B-58 Hustler. This plane was the world's first supersonic strategic bomber, and the book provides insights into its development and rich

history. The book features extensive information on the B-58, right down to the internals of the engines. Though useful for documentation while building a model, this book goes well beyond that; it provides a very complete treatise on Convair's mighty bomber.

Price—\$27.95 (plus \$4.50 S&H).

Specialty Press, 11481 KostDam Rd., North Branch, MN 55056; (800) 895-4585 or (612) 583-3239.

U.S. AIRCORE **F-16 Falcon**

This sleek-looking tractor-jet design uses U.S. AirCore's patented engineering and simple slot and tab assembly, so it goes together in just a few evenings. The virtually indestructible AirCore material allows pilots to perform jet-like maneuvers confidently without the fear of major crash damage. The F-16 requires a .40 to .46 2-stroke engine for power and a 4-channel radio with four servos.

Part no.—USAA2000; price—\$149.99.

Great Planes Model Distributors,

2904 Research Rd.,

Champaign, IL

61826-9021;

(217) 398-6300;

fax (217) 398-

0008;

website: www.usaircore.com.



INFORM YOUR CUSTOMERS!!

Model Airplane News is interested in showing our readers your new products—here in Product News. If you'd like to see your products here, send us a clear photo and a press release that provides information about your product! We'll publish as many as space permits.

Send your announcements to: Product News, Model Airplane News, 100 East Ridge, Ridgefield, CT 06877-4606.



SPECIALTY PRESS **New Warbird Volumes**

Volumes 10 and 11 of the Warbird Tech series have been released. Volume 10 provides insights into the Skunkworks development of the SR-71 Blackbirds, while Volume 11 presents the venerable AT-6 Texan and some of its predecessors. Both texts provide interesting historical information on their subjects as well as 3-views, detail information and other documentation info for the modeler. The Texan volume, in particular, contains many rare photos. If you've ever wanted documentation for Texan bomb racks and/or machine-gun pods, this is the place to look.

Price—\$16.95 (plus \$4.50 S&H).

Specialty Press, 11481 KostDam Rd., North Branch, MN 55056; (800) 895-4585 or (612) 583-3239.

SQUADRON/SIGNAL PUBLICATIONS **B-25 Walk Around**

Squadron/Signal Publications has another winner with its "B-25 Walk Around" volume. Like the other books in this series, it provides the scale modeler with complete exterior details of the aircraft, interior data and insights into the differences between models that should provide sufficient info for any level of modeling precision. Also included are 3-views and color and markings information. This 80-page book, illustrated mostly in color, is a must-have for those interested in WW II warbirds.

Price—\$14.95.

**Squadron/Signal Publications,
5 Crowley, Carrollton, TX 75011-5010.**



DU-BRO PRODUCTS **Adjustable Motor Mount**

This new Du-Bro adjustable motor mount is molded of high-strength, glass-filled nylon and includes several extras. Included with the mount is an adjustable engine drill guide, a nose gear steering arm, firewall mounting hardware, engine mounting screws and washers. The motor mount comes drilled for 5/32-inch nose gear wire. The beam length is 3.1 inches, and the maximum width between the beams is 1.5 inches.

Catalog no.—727; price—\$7.50.

Du-Bro Products, 480 Bonner Rd., Wauconda, IL 60084; (847) 526-2136; fax (847) 525-1604.



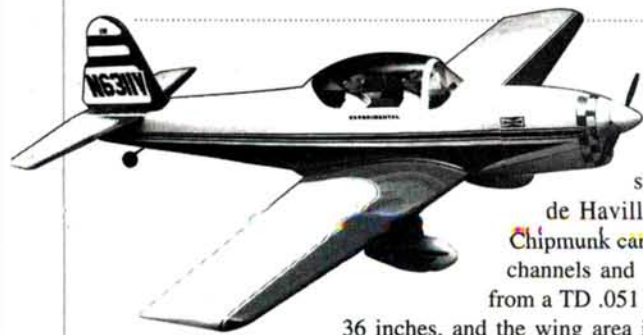
Product **NEWS**

MEGATECH CORP. **MEGAstarter**

The new MEGAstarter delivers the torque needed to start engines up to 1.2ci displacement. Heavy-duty alligator clips provide a secure connection to the 12V starter battery, and the special no-slip switch offers a safe and positive grip while in use. Molded endcaps keep the switch assembly up and away from the dirt, and the aluminum starter cone is grooved to accept heli or boat starter belts. A high-grip rubber insert is included with the starter.

Part no.—MTC1100; **price**—\$29.95.

Megatech Corp., P.O. Box 32, North Bergen, NJ 07047;
(201) 662-8500; fax (201) 622-1450; website: www.megatechrc.com.



HOUSE OF BALSA **Chipmunk**

Many will remember this 1/12-scale, stand-off model of the de Havilland Chipmunk. The Chipmunk can be flown with 2 to 4 channels and with engines ranging from a TD .051 to a .10. Wingspan is 36 inches, and the wing area is 216 square inches. Weight should come out between 22 and 28 ounces.

Kit no.—K-11; **price**—\$49.95.

House of Balsa, 10101 Yucca Rd., Adelanto, CA 92301; (760) 246-6462; fax (760) 246-8969.

GREAT PLANES MODEL DISTRIBUTORS **O.S. .46 VX-DF**

With advanced technology that provides up to 25 percent more power than in the .46 VR-DF engine, the new VX-DF from O.S. will surely be a big hit with the pilots who fly medium-size, ducted-fan jets. A rear-mounted carb and rear exhaust make this ducted-fan engine ideal for tractor-style as well as pusher-style installations. The VX-DF features rear drum valve induction, a bar stock head for better heat transfer, improved porting, a large fin area, a one-piece crankcase design and a high-performance carb. A bolt-on exhaust adapter offers flexibility when selecting an exhaust system.

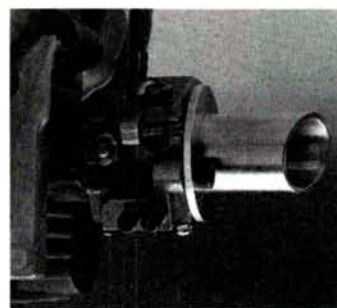
Part no.—OSMG1847; **price**—\$449.99.

Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021;
(217) 398-6300; fax (217) 398-0008; website: www.osengines.com.



GREAT PLANES MODEL DISTRIBUTORS **Velocity Stack**

Great Planes' velocity stack for large-scale gas engines creates a ram effect that directs airflow into the carb of gas engines, such as those made by U.S. Engines. This allows the engine to run more efficiently and reliably and results in better fuel economy and longer flight times. The velocity stack also decreases messy fuel "blow by" on the model.



The velocity stack fits most Walbro carbs and features adjustable rotation for in-cowl use. Constructed from two pieces of machined

aluminum, the velocity stack includes mounting bolts and lock washers.

Part no.—GPM2100; **price**—\$9.95.

Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021;
(217) 398-6300; fax (217) 398-0008; website: www.greatplanes.com.

HOBBICO **Pre-Built Ultra-Tote**

Field-ready in less than an hour, Hobbico's Ultra-Tote ARH (Almost Ready to Haul) field box is sure to be a big hit with busy modelers.

The sturdy caddy comes 90 percent factory-

assembled and pre-painted in yellow. The Ultra-Tote ARH shares all the features of the original Ultra-Tote field box kit, including a large top tray, side drawers and a battery compartment cut out for any standard power panel. The Ultra-Tote also features rubber feet to protect the corners and bottom floor and to prevent the box from sliding around during transportation.

Part no.—HCAP5025; **price**—\$49.99.

Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008; website: www.hobbico.com.



Descriptions of products appearing in these pages were derived from press releases supplied by their manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by Model Airplane News, nor does it guarantee product performance. When writing to the manufacturer about any product described here, be sure to mention that you read about it in Model Airplane News.

CLASSIFIEDS

BUSINESS

SCALE AIRCRAFT DOCUMENTATION and resource guide. Larger, updated 1998 edition. World's largest commercial collection. Over 7,000 different color Foto-Paaks and 35,000 3-view line drawings. 218-page resource guide/catalogue—\$8; Canada—\$10; foreign—\$15. Bob Bank's Scale Model Research, 3114 Yukon Ave., Costa Mesa, CA 92626; (714) 979-8058. [5/98]

GIANT-SCALE PLANS BY HOSTETLER. Send SASE to Wendell Hostetler's Plans, 1041 Heatherwood B, Orrville, OH 44667. Phone (330) 682-8896; fax (330) 683-5357; <http://www.aerosports.com/whplans>. [6/98]

SODA-CAN AIRPLANES—replica biplane detail plans with photos, \$7.50 PPD. Early's Craft, 15069 Valley Blvd. SP 26, Fontana, CA 92335. [8/98]

REPLICA SWISS WATCHES—18KT gold-plated! Lowest prices! Two-year warranty! Waterproof divers, chronographs, others! Phone (770) 682-0609; fax (770) 682-1710.

GEE BEE PLANS used for full-scale R-2, "Z." Ten airplanes, 1/8-1/4. Catalogue/News \$4. Vern Clements, 308 Palo Alto, Caldwell, ID 83605; (208) 459-7608. [3/98]

LARGE-SCALE SAILPLANES AND TOWPLANES—new and used—call (212) 879-1634, Sailplanes Unlimited, 63 East 82nd St., New York, NY 10028. www.sailplanes.com. [5/98]

R/C SKYDIVING: Thrilling free-falls, chute opens by transmitter. Paraflo Parachute duplicates all canopy maneuvers, turns, stalls, spirals, landing flares, etc. Latest catalogue \$1. R/C Skydivers, Box 662M, St. Croix Falls, WI 54024. [4/98]

PLANS—R/C sailplanes, scale, sport and electric. Old-timer nostalgia and FF scale and sport-powered, rubber and towline. All models illustrated. Catalogue \$2. Cirrus Aviation, P.O. Box 7093, Depot 4, Victoria, BC V8B 4Z2 Canada. [4/98]

MAKE REAL DECALS with your computer and printer. Send \$10 for introductory kit to LABCO, Dept. MAN, 27563 Dover, Warren, MI 48093. <http://www.mich.com/~labco/>. [4/98]

BUILD A BIKECAR: <http://www.bikecar.com>. [6/98]

RATES: non-commercial—25 cents per word (no commercial ads of any kind accepted at this rate); commercial—50 cents per word (applies to retailers, manufacturers, etc.); count all initials, numbers, name and address, city, state, zip code and phone number. All ads must be paid for in advance. To run your ad for more than one month, multiply your payment by the number of months you want it to run. Deadline: the 10th day of the month, 3 months in advance, e.g., January 10 for the April issue. We don't furnish box numbers, and it isn't our policy to send tear sheets. Please make all checks and money orders in U.S. funds, payable to: AIR AGE, INC. SEND AD AND PAYMENT TO: CLASSIFIED ADS, Model Airplane News, 100 East Ridge, Ridgefield, CT 06877-4606 or call (203) 431-9000.

LANDING GEAR PLANS: Build functional, spring-loaded gear for any size model. Send \$7.50 shipping and handling to Jesse Lyon, 22 Metro Trail, Hopatcong, NJ 07843. You will never use conventional gear again! [4/98]

NEW ZEALAND AERO PRODUCTS. Scale plans: Agwagon, Airtruk/Skyfarmer, Pawnee, Pawnee Brave, Fletcher FU-24, DC-3/C-47, Cessna 152 Aerobat, Hall's Springfield Bulldog, Fairchild PT-19, Fleet PT-26, Rearwin Sportster, Typhoon and more. Hardware packs, color photo packs available. Free documentation with plans. Catalogue/price list: \$5 (U.S.); Visa/MC. 34 Ward Parade, Stirling Point, Bluff, New Zealand. Phone/24 hr. fax: 643-2128192. [4/98]

FLYRITE BUILDING SERVICE. Experience in fine detail and craftsmanship of any kit. Top Flite, Great Planes, Midwest, Goldberg, Sig, etc. From box to air. (513) 755-8894. [4/98]

MAKE YOUR OWN ROCKET MOTORS!!! Homemade solid and composite fuels power R/C gliders, model rockets, etc. Smoke tracers for R/C planes & choppers, electric igniters, cannon fuse "chemicals," lab acids, glassware, "How-to" Books, videos, rocket motor kits, "huge" catalogue \$2. Pyrotek, P.O. Box 300, Sweet Valley, PA 18656; (717) 256-3087. [8/98]

HELICOPTERS-BOLAR HELI RESEARCH: We build your heli, test your heli, repair your heli. Complete construction with new or your equipment. Also, the best prices on helicopter kits, radio systems (Airtronics, Futaba, JR), engines and exhaust systems. Bolar Heli Research, 322 N. 7th St., Lehighton, PA 18235; (610) 377-4941; email bolar@mail.ptdprolog.net. [4/98]

C/TEC BUILDING SERVICE: Proctor, Sig, Balsa USA, Goldberg, etc. Build to any stage of construction. Quality is our most important product. Redmond, OR; (541) 504-4638. [4/98]

FIGHTER WIND VANE PLANS. Details. Large SASE. Airmodel, Box 72, Ocala, FL 34478-0072. [4/98]

ANTIQUE IGNITION-GLOW PARTS CATALOG, timers, needle valves, cylinder heads, pistons, tanks, spark plugs, racecar parts, rubber scale plans; engines: 1/2A, Baby Cyclones, McCoy's, Phantoms, etc. \$10 pp (U.S.); \$20 foreign. CHRIS ROSSBACH, 135 Richwood Dr., Gloversville, NY 12708. [6/98]

OBECHI VENEER, premium-grade sheets, 1/32" x 12" x 110" long—\$7 U.S. + S&H, more sizes available. We manufacture 15 glider kits ranging from hand-launch to 5-meter scale. Hitec dealer. 10-meter rolls of Ultracote. Send \$0.60 in postage for our photo-illustrated catalog to Dream Catcher Hobby Inc., P.O. Box 77, Bristol, IN 46507, or see our Web page at <http://www.dchobby.com>. To order, call (219) 848-1427; we accept Visa/Mastercard. [4/98]

MODEL WARPLANES: 10,000 plans, kits, only \$28, ppd. John Fredriksen, 461 Loring, Salem, MA 01907; website: <http://www.rconline.com/1812>. [6/98]

HYDE SOFT MOUNTS, all sizes. Orders/info: (702) 269-7829. [9/98]

BUSINESS FOR SALE: established hobby shop, Western Colorado. Mild climate. Contact Charles, (970) 245-5504. [5/98]

AERO FX BY JO DESIGNS. Exact-scale, computer-cut, high-performance vinyl graphics and paint masks. Lettering; nose art; insignia for scale, pattern, pylon and sport flyers; complete graphic sets available. Call or write for free sample and catalogue. JO Designs, Rt. 1, Box 225AA, Stratford, OK 74872; (405) 759-3333; fax (405) 759-3340. [6/98]

CASH FOR ENGINES: ignition, glow, diesel, all types; any condition; sale list, too! Estates my specialty! Send SASE for list. Bob Boumstein, 10970 Marcy Plaza, Omaha, NE 68154; (402) 334-0122. [6/98]

DETHERMALIZING CERTAINTY. For most free-flight models. Weighs 0.7 to 1.2 grams. Large SASE to Wheels & Wings, P.O. Box 762, Lafayette, CA 94549-0762. [5/98]

ENGINES: IGNITION, GLOW, DIESEL. New, used, collectors, runners. Sell, trade, buy. Send \$5 for huge list to Rob Eierman, 504 Las Posas, Ridgecrest, CA 93555; (619) 375-5537. [6/98]

AIRCRAFT WEATHERVANES: copper aircraft weathervanes for your home, yard, or hangar. BARNWORKS, Inc. Online catalogue <http://www.barnworks.com>. [4/98]

WW I GIANT-SCALE KITS! Fokker D-8, 111-in. span, Fokker D-7, 72-in. span, Junkers CL-1, 80-in. span. Send SASE to: JB Models, 22 Stone Church Rd., Rhinebeck, NY 12572; (914) 876-5354. [4/98]

FLY FOR REAL IN THE SAFEST, EASIEST-TO-FLY AIRCRAFT IN THE WORLD. Learn to fly in one day, build or buy used, no licenses required. Powered Parachute Newsletter. Lots of good information on powered parachutes, featuring the largest collection of used powered parachutes for sale in the world! \$20 annual subscription, 4 issues. Visa or Master Card. Portland Powerchutes Inc., 28621 S.E. Woods Rd., Eagle Creek, OR 97022; (800) 457-4310. [4/98]

PLANS-ENLARGING SOFTWARE-PLANS ENLARGING. Old magazines, scanning, plotting. Free information. Concept, Box 669A, Poway, CA 92074; (619) 486-2464. [4/98]

WEEDEATER CONVERSIONS. We custom-convert small engines for model aircraft. Homelite, Ryobi, Weedeater, McCulloch, Makita and Honda engines and engine kits. Information and dimensional drawing, \$5. Visa/Mastercard. Carr Precision, 6040 N. Cutter Cir., #303, Portland, OR 97217; (503) 735-9980; fax (503) 285-0553; website: <http://home.att.net/~carrprecision>. [4/98]

WW I PLANS. Over 600 in stock. Laser-cut parts. Printed lozenge tissue. Send \$5 for illustrated catalog to Clarke Smiley, 23 Riverbend, Newmarket, NH 03857. [9/98]

BUILDING SERVICE. We build to "Bones," you finish and save big \$! Kits to scratch, large-scale specialists. (513) 528-7221. [6/98]

SAVE 500% TO 900% when purchasing rechargeable batteries—from 60mAh to 2400mAh—at a fraction of the cost of normal batteries. For information and other related electronic components, send a large SASE with \$5 to Richard Manning, 5 Columbia Dr., Ste. 103, Niagara Falls, NY 14305-1275. [6/98]

GUIDE TO COMPUTER RC SYSTEMS. Don Edberg's 190-page book describes EVERYTHING about programmables: how they work; sport, fun-fly, pattern, sailplane, helicopter setup instructions; pictures & explanations of built-in functions; 21 custom programmable mixer examples; model trimming, maintenance, troubleshooting, more. Computer radio owners should have the Guide; shoppers become smart buyers, learning what everything means. Only \$20. RADIO COMPARISON CHART tells what has what! 23+ types compared, 12 pages, \$5 (\$3 w/book). PROGRAMMING FUTABA'S SUPER 7—replaces factory manual with 96 READABLE pages! 3,000 sold! \$18. Dynamic Modelling, 4922-23 Rochelle Ave., Irvine, CA 92604-294; toll free (888) 770-1812; (714) 552-1812; email dynam-ic3@flash.net. VMC/Disc cards accepted. Prices INCLUDE priority mail delivery. Check/MO, \$1 discount. [4/98]

1/2A PLANS: .049 Cox 2-channel. Debutant and Dasher. Balsa and ply. Unique designs for the scratch builder; SASE for flyer. Doodles, Box 434, Manitowoc, WI 54221-0434. [5/98]

AVIATION MODELER INTERNATIONAL is for everyone interested in building and flying model aircraft. Each issue is packed with up-to-date information, full color and TWO FREE PLANS. For a one-year subscription (12 issues), send \$69 check payable to "Wise Owl Worldwide Publications," 4314 W. 238th St., Ste. B, Torrance, CA 90505-4509; (310) 375-6258. [7/98]

ALUMINUM CAN PLANS. Airplanes, Dragster, Ship. SASE for list. Tesscar, Box 333A, Scappoose, OR 97056, or <http://members.aol.com/tesscar>. [6/98]

HOBBYIST

MAGAZINE BACK ISSUES—American Modeler, American Aircraft Modeler, Aeromodeller, Model Airplane News, Model Aircraft, RCM and more, 1930s–1990s. For list, send SASE to Carolyn Gierke, 1276 Ransom Rd., Lancaster, NY 14086. [5/98]

MODEL AIRPLANE NEWS, 1930-1980; "Air Trails," 1935-1952. "Young Men," 1952-1956; "American Modeler," 1957-1967; "American Aircraft Modeler," 1968-1975. \$1 for list. George Reith, 3597 Arbutus Dr. N., Cobble Hill, B.C., Canada V0R 1L1. [5/98]

WANTED: old, unbuild, plastic model kits from '50s and '60s. Send list, price to Models, Box 863, Wyandette, MI 48192. [3/99]

WANTED: model engines and racecars from before 1950. Don Blackburn, P.O. Box 15143, Amarillo, TX 79105; (806) 622-1657. [5/98]

WANTED: plans and instructions for "Ms. Martha." Will consider buying entire kit, if available. Call Mike, 10 a.m. to 6:30 p.m. EST, (607) 735-0410. [4/98]

WANTED: book entitled "The Fabulous Ford Tri-Motors" by Henry Holden. State condition and price. Raymond Leone, 219 N. Jefferson St., Batavia, IL 60510. [4/98]

NEED: company that repairs older "Reed" radios. Need working "Reed" servos; Graupner "Cirrus" kit. Reasonable. (213) 661-5500; fax (213) 661-5430. [5/98]

STAUDACHER S-300D. 28 percent scale, 80+ inch span. Under 15 lbs. Rolled plans, \$37.50 p.p.d. Bruce Lund, 17 St. Charles Pl., Daphne, AL 36526. [4/98]

FOR SALE: large inventory R/C and other kits. Send legal-size SASE. Don Huff, 919 Carson Dr., Sunnyvale, CA 94086; (408) 736-1442. [6/98]

FOR SALE: Airtronics Infinity 600 Radio. Used only a few times. Like new. \$269. (805) 461-6408. [4/98]

FOR SALE: a collection of show-quality, giant-scale model airplanes. Super Stearman, Corsair and many more. Lou, (973) 628-1623. [4/98]

FINAL CLEARANCE—remaining aircraft items. Send SASE for list. G. Hunnicke, 18 Media Dr., St. Louis, MO 63146. [5/98]

OLD AIRPLANE KITS and toys for sale. Wood, plastic, metal. Send SASE for free list. Dave Richardson, 10035 Dallasburg, Loveland, OH 45140. [4/98]

EVENTS

3rd ANNUAL HUGE MODEL SWAP MEET: Grants Pass, OR. Josephine County Fairgrounds, Hwy. 199, Exit 55 off Interstate I-5. Admission \$1—free parking. Sat., April 11, 1998, 8:30 a.m. till 3 p.m. 100 tables for sale @ \$10 ea. Setup time, 7:30 a.m. Call (541) 476-3162 for flyer; fax (541) 474-5828. [4/98]

T.O.C. OF MARYLAND FLY-IN AND COMPETITION, May 29, 30 and 31, weekend extravaganza. Packed full of flying and fun. Mixed open, demo and competition flying—Saturday/Sunday afternoon. \$5 prizes. For more info, call Art Vail, (410) 247-4281. [6/98]

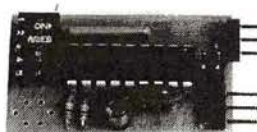
April 19: Elk Grove Village, IL. Chicagoland Radio Control Modeler's 17th Annual Auction and Swap Meet. At Hattendorf Center, 225 E. Elk Grove Blvd., Elk Grove Village, IL. 10 a.m.—2 p.m. General admission \$3; vendors \$12 (first table) includes 1 admission. Additional tables, \$10. Setup 8:30 a.m.—10 a.m.; doors open to public 10 a.m. Auction @ noon. Advance reservations accepted. Dave Crown, 9386 Landings Square, #507, Des Plaines, IL 60016-5270; (847) 824-6392. [5/98]



PRECISION MICROELECTRONICS

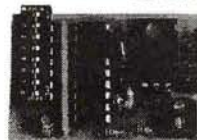


ElevonMixer



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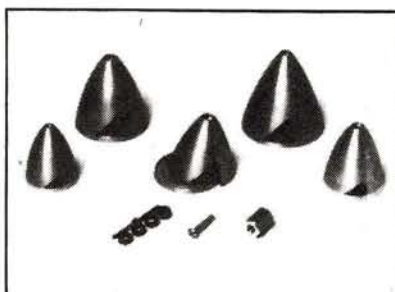
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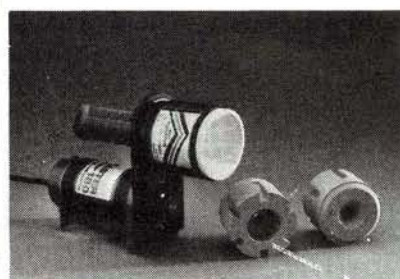
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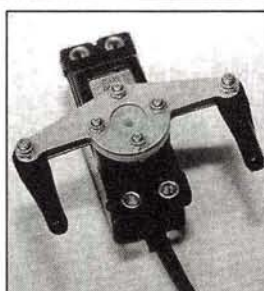
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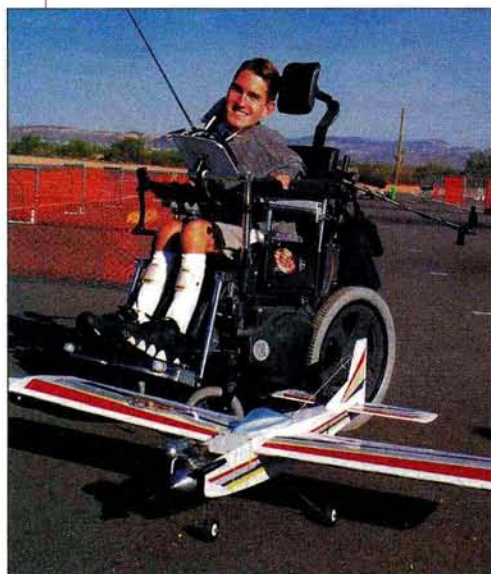
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SO YOU THOUGHT FLYING WAS A CHALLENGE...

HOW MANY OF us are either just learning to take part in this wonderful hobby or are already seasoned R/C aircraft pilots? Remember the first time you put your thumbs on the sticks and took "control" of your aircraft? Most of us felt as though we were sitting on top of the hobby world. This was the time in our busy schedule when



Jacob is a member of the Arizona Model Aviators in sunny (and sometimes a little warm) Mesa, AZ.

we could let go of our daily grind and enjoy an activity shared with others. Remember when you were finally proficient enough to walk around with your chin held high and proclaim, "I am a pilot. I let my fingers do the talking." Now, imagine for a moment that you're a proficient R/C pilot, but that your fingers have never touched a transmitter! How might this be? Well, let me introduce you to Mr. Jacob Yetter.

Jacob is a member of the Arizona Model Aviators in sunny (and sometimes a little warm) Mesa, AZ. You might ask what makes Jacob so unique; after all, you can fly your airplane and even perform a few maneuvers. The difference, folks, is that Jacob is only able to use his "Jay Leno"-type chin to control his aircraft. You see, at age 3, Jacob

was struck by a car that left him confined to a wheelchair as a quadriplegic. Jacob, using nothing more than his chin, sheer determination and his sister or nurse to turn the wheelchair in the direction of flight, manipulates the controls on his aircraft with a precision most of us Sunday flyers would envy.

He sends his Great Planes Easy Sport through loops, spins and inverted flight with such ease and precision that you would think that he had been born with a transmitter under his chin. Remember, Jacob, now 18 years old, cannot use his hands and arms to make this happen. Instead, he manages to use his chin to control both sticks of the transmitter, which is secured to his wheelchair. His flying talents bring cheers from the crowd and tears of joy and pride to many of us. Veteran pilots sit and watch in amazement as Jacob shows them a thing or two.



Jacob's nurse positions him so he can follow the aircraft.

Now that you've heard a little about Jacob, let me take you through the process that got Jacob his wings. When he first became interested in the hobby, several people told him not to get his hopes up too high because this was a difficult task. Scoffing at non-believers, Jacob headed out to Superstition Airpark

(the home of the Arizona Model Aviators) to find out just how to do it. "I knew I *could* do it; it was just a matter of learning *how* to do it," said Jacob. So, a few years

ago, he and his uncle got together to fly gliders. Although this was fun, he yearned for aircraft with engines. Together with his uncle, he experimented by trying different engines on the gliders; unfortunately, that didn't work well.

Next, they purchased a trainer and set out to learn about flying. Jacob learned how to make turns; however, he had to rely on his uncle to take off and land because it required the manipulation of two sticks at the same time. This, coupled with the fact that he had to arrange his flying times around his uncle's schedule, was frustrating to Jacob. Enter the Arizona Model Aviators and Jacob's instructor, Vic Westlund. Vic was proud that Jacob decided to stick with the hobby and learn how to become a proficient pilot. To Vic's credit, he didn't treat Jacob differently from any other student pilot.

With the transmitter mounted on his wheelchair, Vic and Jacob embarked on what would turn out to be a wonderful experience for both. Using the student and instructor programs developed by chief flight instructor John Midgorden, they began the training process. Much to Vic's surprise, it took Jacob only 10 lessons to solo successfully. "That's amazing, considering it usually takes other students 20 to 30 lessons to accomplish the same."

Today, Jacob continues to amaze club members and spectators alike. Although his "flight crew" is responsible for starting the airplane, Jacob takes over from there. The Arizona Model Aviators are proud to have Jacob on their team.

So, the next time you think you have it rough, take a moment to think about Jacob and his accomplishments. He's an inspiration to the hobby and to each and every one of us as human beings.

—Jim Luby